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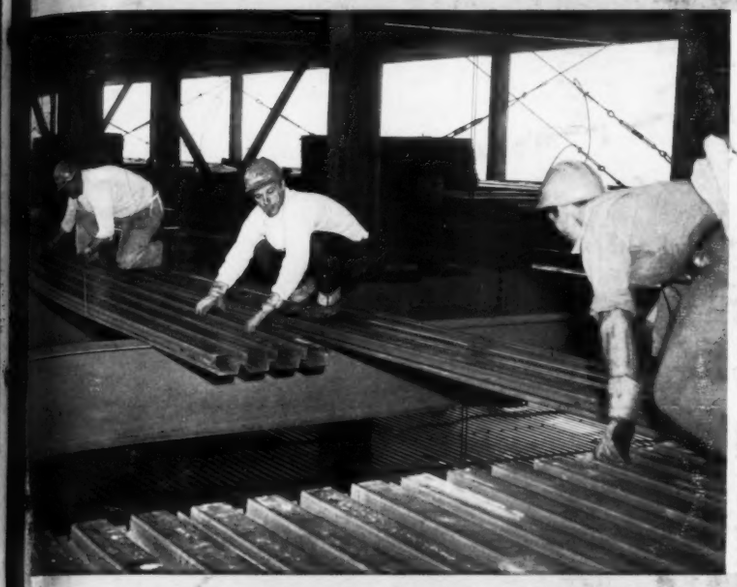
Contractors and Engineers

magazine of modern construction



In one of many well-coordinated operations, Robertson Q-flooring is placed over steel floor beams for the Ford Motor Co. headquarters.

The flooring is used immediately as a Manitowoc 2000 crane swings a Blaw-Knox bucket to Jaeger bins supplying concrete to buggies.

In the basement of the 12-story building, the concrete floor is given a final finishing by a workman with a Whiteman mechanical trowel.

A Ross fork truck lifts a granite slab into position on the exterior of the building as a clamp tongs enables men to handle the slab easily.

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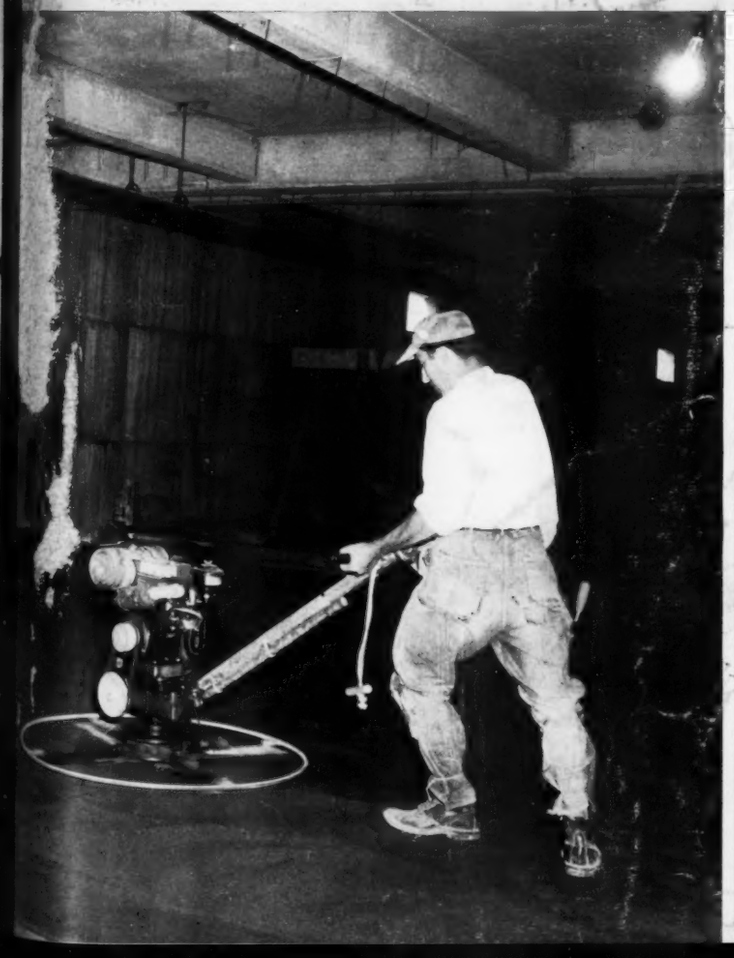

The Asphalt Institute moves to University of Maryland

-a significant development for road builders and other Asphalt users

Universal testing machine for applying compressive loads to specimens of Asphalt paving mixes.

Unique multiple-temperature control apparatus for laboratory testing for Asphaltic materials.

As a member of The Asphalt Institute, The Texas Company takes pride in calling attention to the Institute's new, larger and better-equipped quarters on the campus of the University of Maryland. The new building was officially dedicated early this month.

To America's road builders in particular, but to all other asphalt users as well, this move is important because it substantially increases the capacity of The Asphalt Institute to serve them.

The new laboratory, which occupies the entire first floor of The Asphalt Institute Building, is several times as large as the former "lab" and it is equipped with a number of new pieces of testing equipment.

At the rear of the building, there is a large tract of ground which will be used to test the performance of asphalt under actual service conditions.

With the nation on the threshold of the biggest highway construction program in its history, this substantial enlargement of the capacity of The Asphalt Institute to serve road builders is particularly timely.

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Contractors and Engineers

magazine of modern construction

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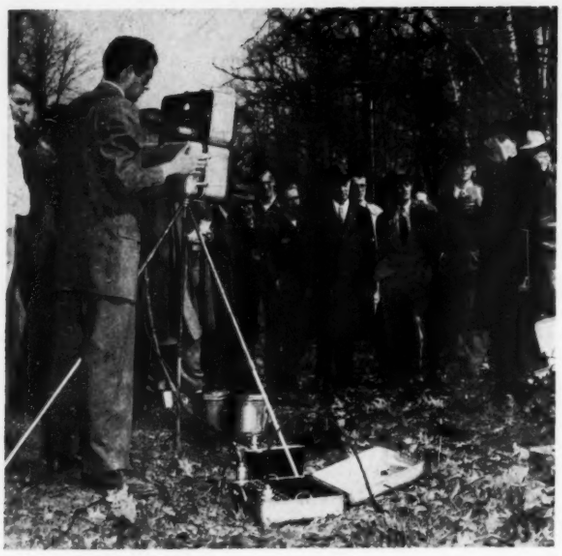


EDITORIAL

Wanted: highway engineers

Those who are inclined to feel that the shortage of highway engineers is either a myth or an excuse for delayed highway programs may be startled to find that this very real shortage may prove the greatest bottleneck to the proposed expanded road program. This fact was brought home forcibly to delegates at the annual convention of the Associated General Contractors of America by A. C. Clark, deputy commissioner for engineering and construction, U. S. Bureau of Public Roads.

Approximately 33,000 engineers are employed on the current highway program of about $4 billion annually, according to Clark. And about 1,000 more engineers will be needed annually to maintain the current level of work. This means that one quarter of the 4,000 civil engineering graduates available each year will be required as replacements in order to keep highway construction moving along at its present pace.

A Highway Research Board report, quoted by Clark, indicates that every additional $1 billion of work under the expanded road-building program will require 4,000 additional engineers. Thus, even if all civil engineering graduates entered the highway field, their number would still be insufficient to the do the job.

Four means are left open for overcoming this shortage. Young men must be encouraged to study civil engineering. Graduates must be drawn to the highway field. Older engineers must be attracted from other fields. All available engineering manpower must be used to maximum advantage.

Probably the greatest problem right now is making the best use of all engineering manpower available. The outstanding opportunity for conserving this manpower lies in using advanced methods and modern equipment. Aerial mapping, electronic machines for surveying and analyzing traffic, electronic devices for subsurface exploration, and typewriters for lettering plans are just a few uses of equipment which can speed operations. Delegating routine work to subprofessional technicians will leave engineers available for other duties.

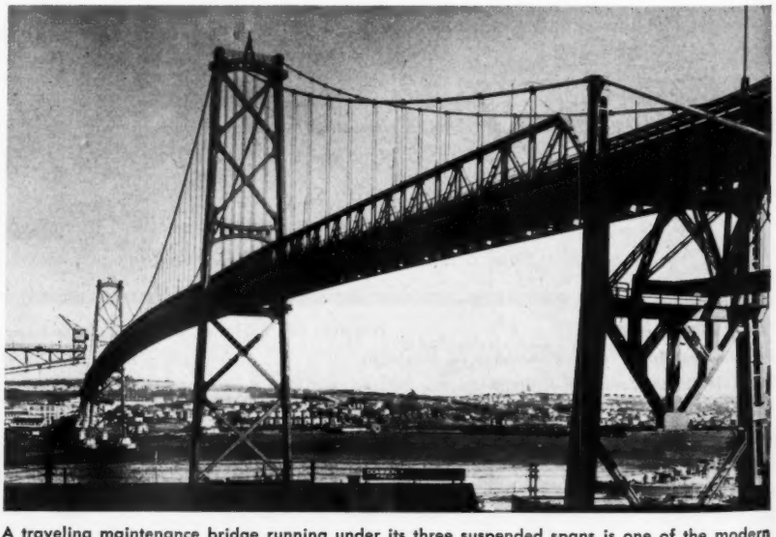
While machines and technicians may substitute for engineering manpower in some areas, there is no substitute for the very best engineering judgment required to make many top-level decisions on highway location and design. Highway-building agencies must have the best engineers available when a single decision may represent millions of dollars in construction and right-of-way costs.

The solution to the shortage problem requires a continuing program in which the best engineering graduates must be recruited, trained, promoted as quickly as possible, and paid at least as much as private industry offers. A start on such a program has been made by AGC through its scholarships, public relations programs, and political activities. But everyone in the construction industry can lend an active helping hand in this program to insure that the highway program will not bog down through a lack of qualified highway engineers.

NEWS AND VIEWS

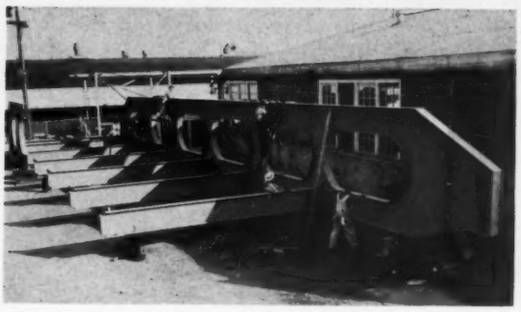
Seven plans for keeping salt water from flowing into farm lands near the San Francisco Bay area, salvaging fresh water for agricultural and industrial use, and preventing floods are now before the California legislature. But one plan in particular has aroused enthusiastic support. Unlike the six others submitted, the plan does not call for the erection of barriers in the bay itself. Instead, two barriers 650 and 500 feet long would dam the Sacramento River and one of its tributaries, holding back water from the bay and conserving a million acre-feet of fresh water annually. A navigation lock would permit vessels to use the stream. This practical solution has won added support because its cost of $152 million makes it the cheapest of the plans submitted. If the plan is adopted, a 75-year old California problem will have been solved by C. Biemond, a Dutch dike engineer active in the Zuider Zee project, who worked out his proposal after two months of study.

Latest figures from the U. S. Department of Commerce and Labor show $8,400,000,000 worth of new construction set in place for the first quarter of the year—a rise of 13 per cent over last year's first quarter. Should this rate continue, 1955 construction will set a new record of $41 billion. The probability of this happening is good, according to a survey made recently by Associated General Contractors of America. The survey report expects $16 billion to be spent for maintenance and repair work, bringing 1955 construction to a new high of $56 billion.



A traveling maintenance bridge running under its three suspended spans is one of the modern features of the $10,750,000 Halifax-Dartmouth bridge opened last month across Halifax Harbor, Nova Scotia. Dominion Bridge Co., Ltd., Lachine, Canada, was prime contractor on the span which has a total length of 5,290 feet including approaches.

The operator in the background uses manual Lincoln-weld equipment to weld Vierendeel girders that have been tack-welded by the operator in the foreground. . . .



and here one of the all-welded Vierendeel girder spans for the three-bridge job is temporarily assembled in the contractor's yard. Shop fabrication of the girders cuts erection costs.

This 100-foot girder span for one of the bridges provides a 19-foot 6-inch roadway which widens to 39½ feet at the bridgehead.

Vierendeel spans cut costs on three bridges

by **E. H. WEIL, District Engineer**
The Lincoln Electric Co., Portland, Oreg.

West Coast Steel Works, Portland, Oreg., recently fabricated four all-welded Vierendeel girders in its shop, saving both money and erection time in constructing three bridges across the Umpqua River in Oregon.

The unconventional girders are used in four spans built for Douglas County, one for the Bullock Bridge, one for a bridge near the town of Umpqua, and one on each end of a bridge near Elkton. The 100-foot-long span on the Bullock Bridge provides a 19 foot 6 inch clear roadway, the one near Umpqua is 126 feet long and has a clear roadway width of 19 feet 3 inches, and the two spans on the Elkton bridge are 108 feet long with a 17 foot 6 inch roadway.

On the Bullock Bridge, the girders have six panels each, their upper and lower chords being made of 27-inch WF 94-pound beams. Flanges of the beams are cut and rolled to a 2 foot 9 inch radius to make openings in the girder. This type of girder construction lends itself to welding by omitting the diagonals found in more conventional trusses and reducing the joints to the simple form of a T.

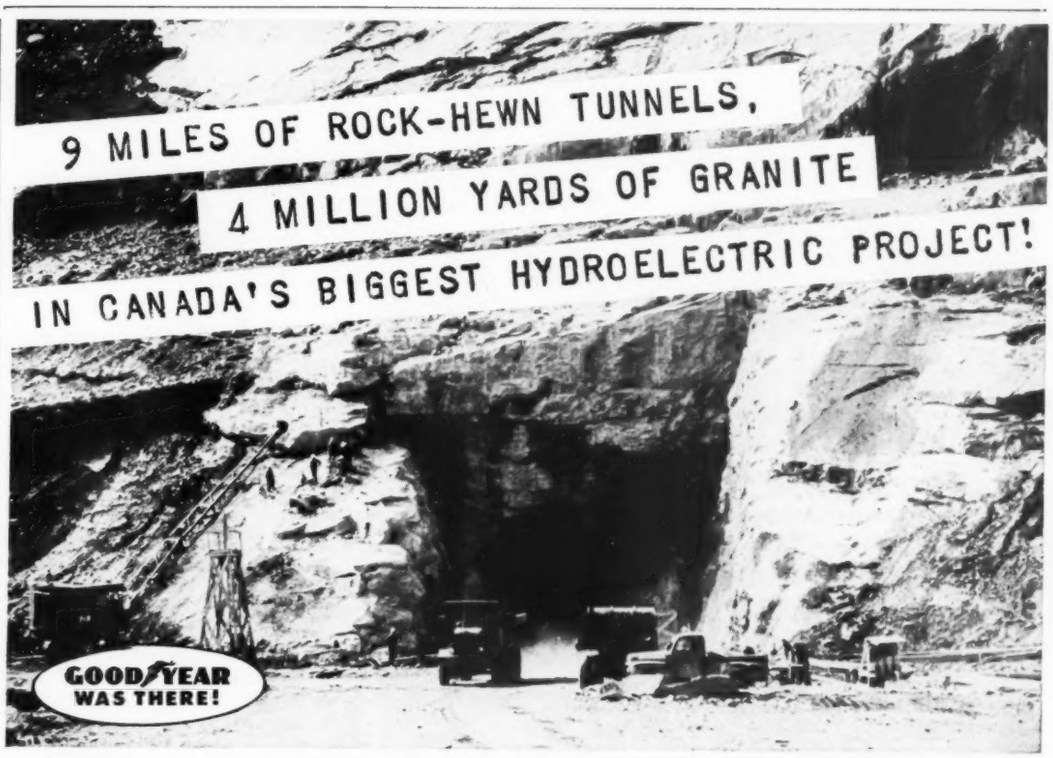
Simple Panel Connection

Unlike standard truss framings, which have at least two web members connected to the chords at each panel point, Vierendeel girders have only one member joining the chords at every panel connection. The Vierendeel girder has a heavier weight, since it uses more steel than conventional trusses with diagonals. This small disadvantage is more than counterbalanced by the savings that can be achieved through simple fabrication and the lower cost of erection.

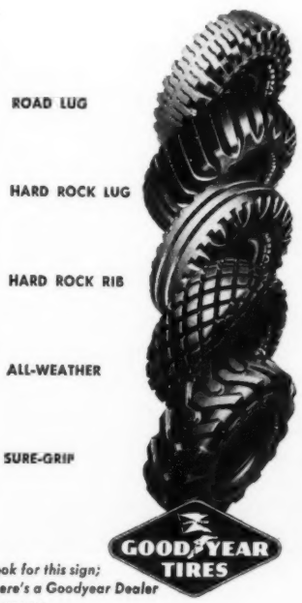
Fabrication requires only a few simple welded connections. The fills, made with 7/16-inch plates, are joined to the flanges with double V butt welds. The girders were all-welded by the semiautomatic hidden arc or "squirt" welding process. Hand machines were used for tacking only.

Different types of decking can be used with these girders, including reinforced-concrete slabs, open steel gratings, special rolled-steel shapes, and precast and prestressed-concrete floor panels. Open steel grating was used on the Bullock Bridge job.

Floor beams on the Bullock Bridge are 24-inch WF 76-pound beams which support five 12-inch stringers. These stringers, in turn, support the open steel grating. THE END



5,000 MEN and a huge intercompany pool of equipment are damming the Bersimis and Desroches rivers so 1,200,000 horsepower can electrify southern Quebec and the Gaspé Peninsula. Photo shows rock haulers at mouth of 35-foot diameter, 9-mile tunnel that leads to subterranean powerhouse 565' x 65' x 80' – carved and blasted out of granite too tough for drills! It takes phenomenally durable tires to stand up to the tremendous loads and razor-sharp blasted rock – which is a reason why GOODYEARS ARE THERE!



Look for this sign; there's a Goodyear Dealer near you

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Underneath the armored treads and sidewalls of Goodyear off-road tires is something new and wonderful—3-T NYLON CORD, *exclusively Goodyear's.* It gives tires such vast new durability that users say bruise-breaks and heat-blowouts are practically unknown! Tire growth is controlled—and ply separation and flex failures are virtually eliminated! 3-T NYLON CORD has *added so much* to tire life—*subtracted so much* from operating costs—that you should see the facts-of-record before buying or specifying *any* tire for *any* operation. Goodyear Truck Tire Dept., Akron 16, Ohio.

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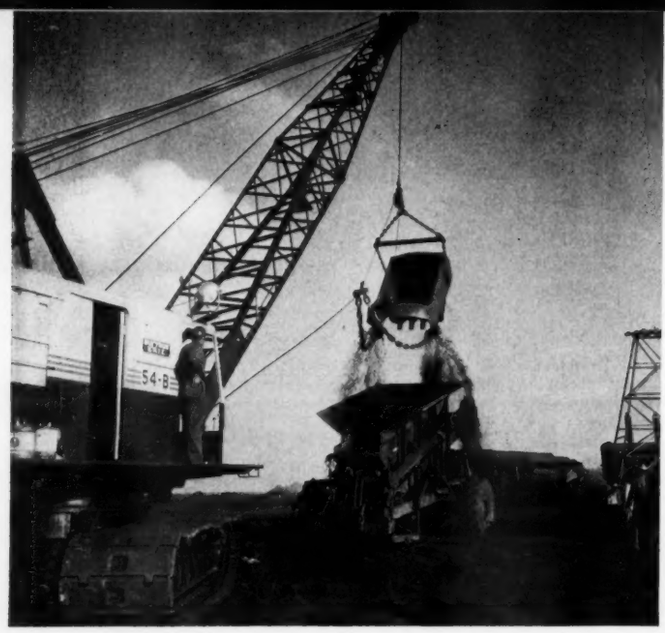
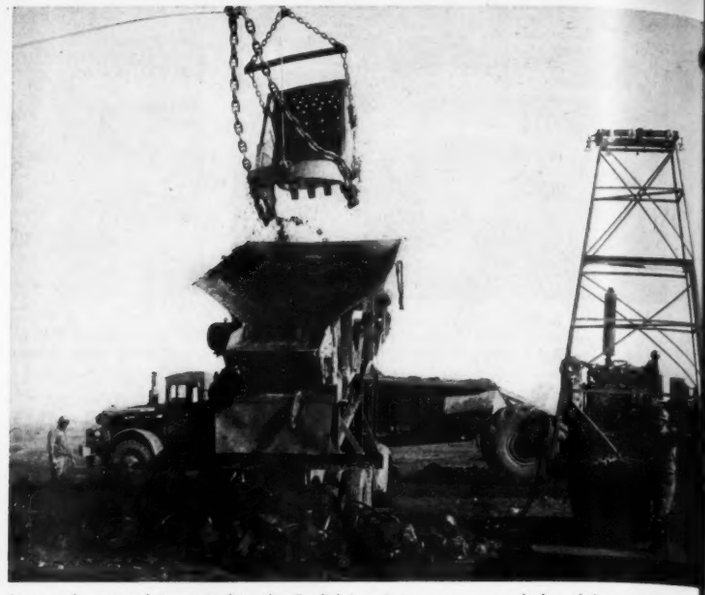


A Bucyrus-Erie 54-B with Page 3½-yard dragline bucket dumps waste foundry sand and assorted junk into the hopper of a Simplicity vibrating screen. Only material passing the 6-inch screen is used in the fill.
C&E Staff Photos



Screened material is carried to the Euclid (rear) on a conveyor belt, while wood and debris are discharged at the front of the hopper. A light tower and Ready-Power generator are mounted on an International truck at right.

A bottom-dump "Euc" dumps a load of unscreened wasted foundry sand on a bridge approach fill. Oversize matter is picked out by workmen and thrown over the edge as the material is dumped.

Waste from foundry dum builds expressway grade

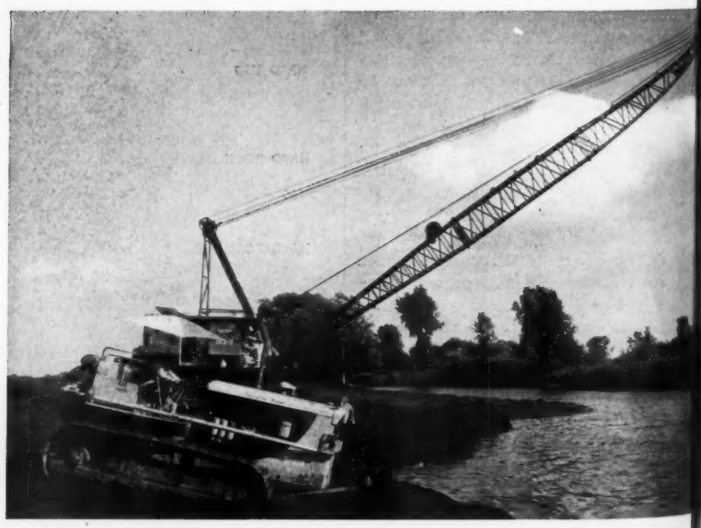
Reversing the old saying, "Haste makes waste", a contractor on the Detroit-Toledo Expressway used waste to make haste. Strange as it may sound, S. J. Groves & Sons Co., Minneapolis, Minn., actually used a huge accumulation of foundry waste to complete in just 3½ months a grading project which was scheduled to be done in 11 months.

The project was the construction of just under a mile of expressway grade across a swamp and a dump at Monroe, Mich. When the contract was awarded on August 30, 1954, the contractor had already been at work for two weeks. By early December the job was done, although the contract specified a completion date of July 31, 1955.

The Detroit - Toledo Expressway will link these two busy industrial centers of Michigan and Ohio with a toll-free superhighway. On a typical section of the completed road, two 24-foot concrete pavements with 10-foot shoulders on each side of each roadway will be separated by a depressed median for maximum traffic safety. Access is limited to a very few interchanges in the 30-odd miles of highway, and all railroad and high-

A Caterpillar D8 tractor-dozer pulls a Bros 50-ton rubber-tire roller to compact the bridge approach fill. S. J. Groves & Sons Co., Minneapolis, Minn., was the general contractor on this mile of expressway grade.

Where material in place on the alignment of the roadway was unsuitable for compaction as subgrade, the Bucyrus-Erie 54-B loaded it into Euclids to be hauled away and wasted.



While a D8 works sand right down to the water's edge so as to maintain a slope and force the muck out ahead of the fill, the Bucyrus-Erie 54-B excavates peat and muck from the swamp area with a 2-yard clamshell.

way crossings will be separated. A connection with the Ohio Turnpike at Toledo, Ohio, provides expressway connections east and west. Most of the grading has been completed and structures are either complete or under construction. Contracts for the first paving sections have been awarded, and much of this work is well under way.

The foundry dump at Monroe lies in a big swamp on property owned by the Port of Monroe Authority. More than 60 large industrial foundries in the Detroit area ship from 45 to 120 carloads of waste material daily to this site. The railroad gondolas, which contain paper, rags, wood, metals, other unusable materials, and waste foundry sand, are unloaded by Dixie Fuel & Supply Co., Monroe, under a contract with the plants which dump waste there. In the normal operation, combustibles are burned as they are unloaded and the remaining materials are dozed over the bank into the swamp. As the fill advances, more tracks are laid so the cars can always be unloaded near the edge of the swamp. Land which is reclaimed from the swamp by this fill is to be used by the Monroe Port Authority for port facilities and industrial sites.

Dump Salvage Operation

The expressway alignment bypasses the City of Monroe on the Lake Erie side, crossing a portion of the finished dump area and a portion of unfilled swamp. In addition to the soil exploration studies conducted by the Michigan State Highway Department, an interesting salvage operation at the dump undoubtedly influenced the decision of the highway department to use the waste foundry sand to build the roadway grade in this section.

Noting that there was a considerable volume of metal in the noncombustible portion of the dump fill, Fritz Bros., Inc., Romulus, Mich., developed a mechanized process for separating this metal from the remainder of the fill. Using a combination of standard earthmoving machinery with screens, conveyors, magnetic pulleys, and other devices, Fritz Bros. actually rehandles more than half of the fill material to salvage the valuable metals. The firm's knowledge of the nature of the materials in the dump and the methods by which they could be handled was of great help in utilizing the material economically in the construction of the roadway grade. In fact, Groves sublet the loading and cleaning operations to Fritz Bros.

Where the expressway crosses a section of the completed dump fill, the major problem of the highway department and the contractor was to be sure of the stability of the subgrade. The first step was to excavate the entire width of the roadways to a depth of 5 feet below the planned grade of the highway. If this excavation disclosed too great an amount of undesirable material such as wood or rags, the excavation was carried as much as 12 feet below grade.

This subgrade was then rolled with Tampo and Bros 50 to 60-ton rubber-tire rollers drawn by Caterpillar D8 tractors. This embankment foundation rolling, as it was called, was measured and paid for in 100-hour units, and was continued until there was no longer any apparent settlement or movement of the subgrade. This indicated that the peat had either been squeezed out from under the fill or was trapped and sufficiently compacted to support the highway loads. Upon completion of the rolling, the area was built back up to grade with selected and cleaned foundry sand.

Handling Foundry Sand

Several big draglines loaded the foundry waste into a fleet of Euclid bottom-dumps which hauled to the grade. Although Fritz Bros. subcontracted the entire operation of loading and cleaning the sand, it rented some of Groves' draglines to augment its own equipment from time to time. Fritz Bros. had a Bucyrus-Erie 54-B with a Page 3½-yard dragline bucket and a P&H 655 with a Page 2-yard bucket. On this phase of the work Groves used a Northwest 6 with a Hendrix 2½-yard dragline bucket and a Northwest 80-D with a Hendrix 3-yard bucket.

In some areas of the dump, the material was clean enough to be loaded and hauled to the grade without preliminary cleaning. Where such material was being used, workmen picked out undesirable materials by hand after the "Eucs" dumped their loads on the grade. The pieces of wood, concrete, and other unwanted debris were brought to the surface by the dozers which spread the loads into thin lifts as they were dumped. Each lift was thoroughly rolled by one of the big pneumatic rollers as the fill was built.

Where the material was not clean enough to permit immediate handling, the subcontractor utilized some of the machines which had been developed for the salvage operations. One of these setups consisted of a Simplicity 4×12-foot vibrating screen with 6-inch square openings, mounted over a 38-inch conveyor belt. The screen and belt were driven by electric motors of 20 and 30 horsepower, respectively. Power was generated by an auxiliary unit consisting of a Ready-Power three-phase 230-volt 62-kw generator driven by an International UD-18 engine. This unit was mounted on an International truck which also carried a steel tower fitted with floodlights for night operation.

In the typical operation, one of the big draglines excavated the material from the dump and dropped it in the hopper over the screen. Sticks, large stones, and other materials which would not pass the 6-inch screen were discharged at one end of the machine, while the materials which passed the screen fell on the conveyor belt and

B. G. Coon Construction Company's

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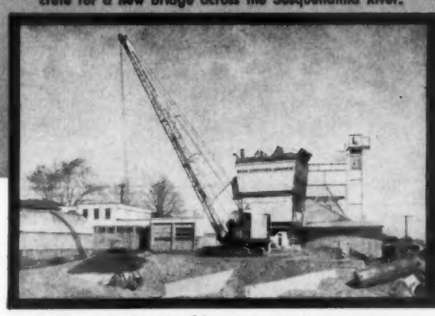
Here's another example of how MARION-OSGOOD-GENERAL quality and design has paid off for another large construction firm. We'd welcome an inquiry and the opportunity to give you all the profit-facts on MARION-OSGOOD-GENERAL equipment.

GENERAL Model 327, 1 cu. yd. clamshell supplying aggregates to Coon's concrete plant at Avondale, Pa. This 55-foot boom machine is very fast, Mr. Coon states. The plant is supplying 40,000 cu. yds. of concrete for a new bridge across the Susquehanna River.

GENERAL Model 322, 25-ton truck crane erecting steel bin section at West Wyoming, Pa. "This versatile machine has given us excellent service as a clamshell, dragline and crane, with booms up to 90 feet," states Mr. Coon.



GENERAL Model 322, ¾ cu. yd. clamshell supplying aggregates to Coon Certified Concrete plant at Luzerne. Mr. Coon states this machine is very fast.

OSGOOD Model 810, 1½ cu. yd. shovel excavating on 8½-mile Pennsylvania state highway job. Says Mr. Coon, "This machine is rugged and fast and will easily load 2,000 cu. yds. in eight hours."

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were loaded into waiting "Eucs" and hauled to the grade. An International TD-18 tractor with Bucyrus-Erie dozer pushed the accumulation of debris out of the way and kept the area cleaned up to facilitate the operation.

The screening unit described above was mounted on a pair of large rubber-tire wheels so that the dozer could move it from place to place to keep it within range of the dragline. Another somewhat similar unit was mounted on a truck chassis and moved under its own power.

Train Euclid Operators

Hauling, spreading, and compaction of fill materials was done by the general contractor's crews and equipment. A fleet of 12 Euclid bottom-dumps did all the hauling. When the work started it was impossible to locate skilled operators for the "Eucs" because of the heavy demand for trained operators on the Ohio Turnpike projects just a few miles away. Local truck drivers interested in learning to operate the bigger machines were given group and individual instructions by a skilled operator. The instructor then rode with each operator for a few rounds of actual work before starting him out on his own. The 23 operators trained under this program were soon handling the machines like veterans. In fact, after the job had been going a few weeks the two shifts were moving 14,000 cubic yards of earth per day.

Other equipment on the fills included six Caterpillar D8 tractor-dozers, a D7 dozer, and a D6 dozer. Two of the D8 tractors handled the Bros and Tampo 50-ton rollers on the compaction. When extra water was required on the fill for compaction or for dust control, it was supplied from a 3,600-gallon water tank pulled by a Ford F-8 truck. Three Caterpillar No. 12 motor graders maintained haul roads and helped shape the fills. Since the work continued through most of the night, artificial illumination was required. Three Caterpillar 315 generator sets and a Hobart power unit provided power for four sets of floodlights mounted on towers.

Excavate Swamp Muck

At the edge of the foundry dump, the roadway plunged into the deep wet swamp. Peat and muck extended from the surface down as much as 15 feet to a bed of firm blue clay at the bottom. In some areas there was a shallow covering of water over the muck, while other parts of the swamp were covered with growths of vegetation. As the fill was carried out to the edge of the swamp, two Bucyrus-Erie 54-B cranes with Johnson 2-yard clamshell buckets excavated the soft materials and cast them to the side beyond the edge of the roadway section.

Euclids dumped the foundry sand as close to the edge as was convenient, and a Caterpillar D8 tractor-dozer pushed the material over the edge into the hole excavated by the clam. The tractor operator pushed each load right down into the water in order to maintain a slope ahead of the fill which would force the semi-fluid muck ahead instead of trapping it in pockets in the fill.

The swamp excavation accounted for a major portion of the 200,000 cubic yards of excavation included in the project. Backfilling the swamp and building the approaches to the Front Street interchange required a large part of the total of 681,000 cubic yards of compacted embankment—the largest item in the contract quantities. Because of the volume of material discarded in cleaning the sand and the shrinkage due to compaction of the embankment, it was actually necessary to handle well in excess of 800,000 cubic yards of material as measured in the borrow pits.

Box Culverts

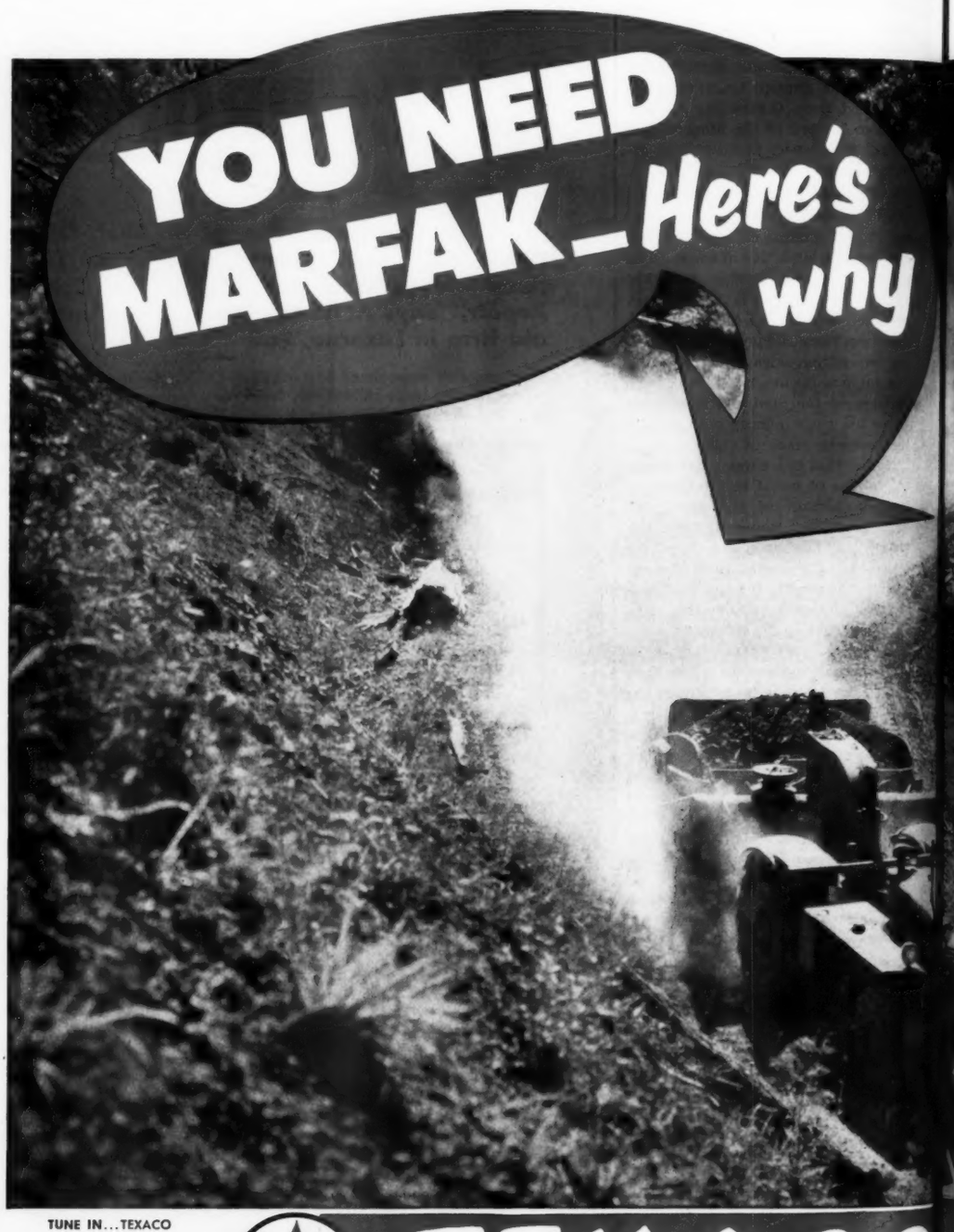
At the Front Street interchange, the roadway embankment reached a maximum height of 37 feet. Because of the flat side slopes, the base of this fill became very wide. Near this point it was necessary to build long box culverts under the main roadway and also under two of the interchange ramps. Largest of these culverts was a box 6×8 feet in section and 236 feet long. The two on the ramps were 68 and 73 feet long.

Form panels were prefabricated of ¾-inch Plyform backed by 2×4 frames, and each panel was re-used a number of times in building the three culverts. Jaeger 2 and 3-inch pumps in sumps in the culvert excavation kept the water level down as the base slab was placed and wall forms set. Ready-mix concrete was bucketed to the forms with a crane and bucket, and the concrete was cured with water and burlap.

Lubrication

Although Groves had 12 Euclids on the job, only 11 of them were operated at a time. Each machine was lubricated once each shift. The spare machine was serviced first. Then, on a signal from the greasing crew, one of the other operators would pull his machine up to the Graco Convoy Luber. This operator would climb right onto the spare machine, take off for the work area, and go right on working without the loss of more than a few seconds. As each machine was serviced, another operator took it over, leaving the machine he had been driving. This same procedure was used when one of the "Eucs" needed minor repairs. A spare Euclid tractor was also kept in reserve. In case of repairs requiring a longer period of time, this tractor could be exchanged for one of the others in about 45 minutes.

The Graco Convoy Luber included a five-reel dispenser unit in a special body mounted on a Ford truck. Motor oil; gear, high-pressure, and track lubricants; and air were supplied



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CONTRACTORS AND ENGINEERS

through the five hose reels. D-A lubricants were used exclusively. The crew not only greased the Euclids each shift, but also changed oil every 60 hours of operation and serviced the engine air cleaners at least once a day.

After completing the lubrication of the "Eucs", the two-man crew made the rounds of the other equipment on the job, giving each tractor and roller a complete servicing every shift as well as lubricating everything on the cranes from the deck down. An oiler on each rig handled the lubrication from the deck up. All of Groves' cranes had the interiors of the cabs painted white. This not only provided good lighting for operation, inspection, and repair of the machines, but also made any grease or oil leak instantly visible.

This project required an unusual amount of planning and management, first because of the speed of the operation, and secondly because of the number of agencies involved. In addition to working with the Michigan State Highway Department, the contractor had to deal with the City of Monroe Port Authority. Access to some parts of the job was over property belonging to private industries, and their cooperation was necessary. There was also the subcontract with Fritz Bros. and the necessity of coordinating other activities with its salvage operations.

The man on whose shoulders this job of coordination and supervision fell was L. C. Brown, project manager of the Monroe Division of S. J. Groves & Sons Co. He was assisted by Charles H. Freeman, project engineer, and E. R. Kenyon, job superintendent. The field office for the division was set up in two 48-foot Florence trailers with custom interiors designed especially for field offices. The payrolls for the 65 employees on the job were handled through this office, together with other job records.

Groves' high-speed operation called for efficient lubricating methods. Here a Graco Convoy Luber, housed in a special body mounted on a Ford truck, services a Euclid. The hoses dispense oil, air, and three kinds of grease.
C&E Staff Photo

Since there were sometimes several jobs operating from this field office simultaneously, it was found extremely practical to equip the office with the base station of a Motorola mobile radio network. Five mobile units were carried in the cars and pickups of principal supervisory personnel.

The Detroit-Toledo Expressway is a project of the Michigan State Highway Department, of which Charles M. Ziegler is commissioner. Project engineer on this work was L. E. Kimball, and the district construction engineer is E. G. Schwoppe. H. J. Rathfoot is road construction engineer for the department. THE END

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Duff-Norton Co. Buys Coffing Hoist Firm

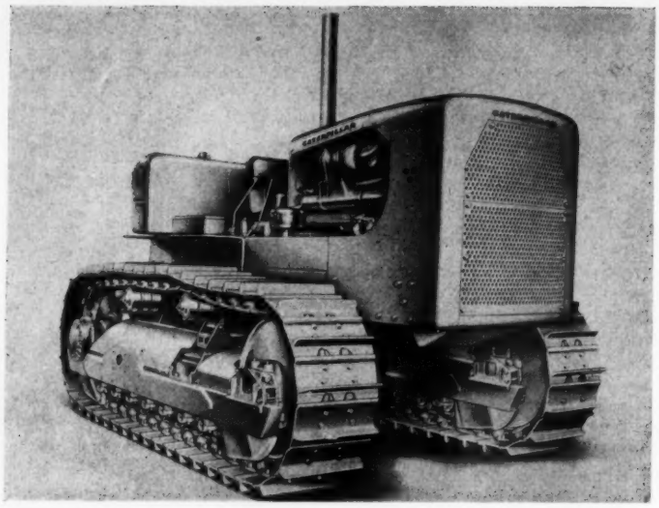
The Duff-Norton Mfg. Co., Pittsburgh, Pa., maker of lifting jacks and a line of ratchet, hydraulic, air-motor, and worm-gear jacks, last month purchased the Coffing Hoist Co., Danville, Ill., which it will operate in the future as the Coffing Hoist Division. The Coffing Hoist firm produces a wide variety of hand and electrically operated hoists and other allied products.

Walter I. Floyd, president of Duff-Norton, will become president of the division as well. Frederick W. Coffing, president and co-founder of the 26-year old company, will continue to be associated with the Coffing Hoist Division as a consultant.

Thomas Industries Buys Wright Power Tool & Saw

Thomas Industries, Inc., Louisville, Ky., manufacturer of home lighting fixtures and spray equipment, has purchased Wright Power Saw & Tool Corp., Stratford, Conn., and will operate the company as a subsidiary. All of Wright's manufacturing facilities have been transferred from Stratford to Sheboygan, Wis., where one of Thomas' five factory sites is located.

John Winthrop Wright, founder of the Wright Power Saw & Tool Corp., will continue to be associated with the Wright company.



The 30-ton Cat D9, sixth machine in Caterpillar's crawler tractor line, is a 230-hp turbocharged prime mover. The product of 10 years of Caterpillar research on big tractors, the crawler model has a new diesel engine, optional torque-converter drive, and an oil-type clutch.

Caterpillar introduces a 230-dhp crawler tractor

A 230-drawbar-horsepower tractor with turbocharged engine became the sixth machine in Caterpillar's track-type line on May 1st. With the introduction of the D9, Caterpillar has in production the biggest most powerful tractor available to date.

The mammoth tractor stands 8 feet 9 inches high (not counting the exhaust pipe), is 17 feet 10¾ inches long, 9 feet 11¼ inches wide, and has a ground clearance of 21 inches. Although the D9 weighs 56,200 pounds with conventional drive and 56,650 pounds in the torque-converter model, the actual weight-horsepower ratio is comparatively low: 235 pounds per drawbar horsepower. Maximum drawbar pull is 60,860 pounds with the direct-drive transmission.

Into the huge machine have gone the advantages developed in more than ten years of research by Caterpillar on big tractors. For the first time in crawler-tractor history the engine is turbocharged to reduce noise and improve engine performance. Driven by the engine exhaust, the turbocharger uses energy which would otherwise be lost. In addition, it packs air into the engine according to engine load rather than engine speed. The result is that the D9 gets all the horsepower possible from the engine. The power unit itself is new, a 286-hp 6¼×8 six-cylinder Caterpillar diesel.

A host of other advances developed in recent years are found in the D9. The tractor has Caterpillar's oil-type clutch or an optional torque-converter drive, in-seat starting, hydraulic track adjustment, constant power drive for rear-mounted equipment, power-boosted controls, excellent visibility, and many servicing advantages. Some of these features, found in recent Caterpillar models, were pressed into service as they were developed. All products of Caterpillar's big tractor-development program, these features were brought together in the D9 to produce a 30-ton machine of unusual operating efficiency.

Developing the D9

The demand for bigger tractors probably began when Ben Holt put tracks on a steamer in California in 1904 and somebody saw the obvious advantages of this type of traction. Caterpillar met this demand when it became large enough to justify the investment. Following World War II, the concern began to consider the feasibility of producing an efficient tractor considerably larger than the D8, the workhorse of the Cat line.

After much preliminary study, Caterpillar officials decided to build a tractor with more than 200 drawbar horsepower to weigh about 50,000 pounds. The D8 itself, benefiting from

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Capable of 60,860 pounds of drawbar pull, the D9 is expected to set new work-output standards on such earthmoving jobs as pioneering, bulldozing, and pusher and scraper work. Here the tractor is shown at work with one of two new bulldozer attachments available.

Thirty-ton turbocharged prime mover, in production after 10 years of big-tractor research, has 60,860-pound drawbar pull

the long experimentation, research, and field testing that followed, was ultimately completely redesigned to incorporate many of the advances that were developed. (An account of the features of the new D8 appears on page 120 of this issue of CONTRACTORS AND ENGINEERS.)

Because of the contemplated size of the D9, engineering actually started from scratch. New clutches, piston rings, valves, radiators, and other components had to be developed. Two hundred sets of track links, built for testing purposes only, were placed on D8's to check their wearing qualities. A wood model of the new tractor not only let engineers see how accessories and controls fitted, but gave them a chance to check clearances and ease of operation.

By February, 1952, a working prototype—the D9X—was ready for the proving grounds. It did everything the operator demanded of it, and Caterpillar built a second pilot model and accelerated its efforts to perfect new components.

One of the most significant forward steps was the oil-type clutch. Since the conventional dry clutch would have difficulty handling more than 150 horsepower, it would not do for the D9. When the oil-type clutch was perfected in 1953, it had an enclosed housing. The friction faces and pressure plates were bathed through grooves and slots so that the heat would be removed.

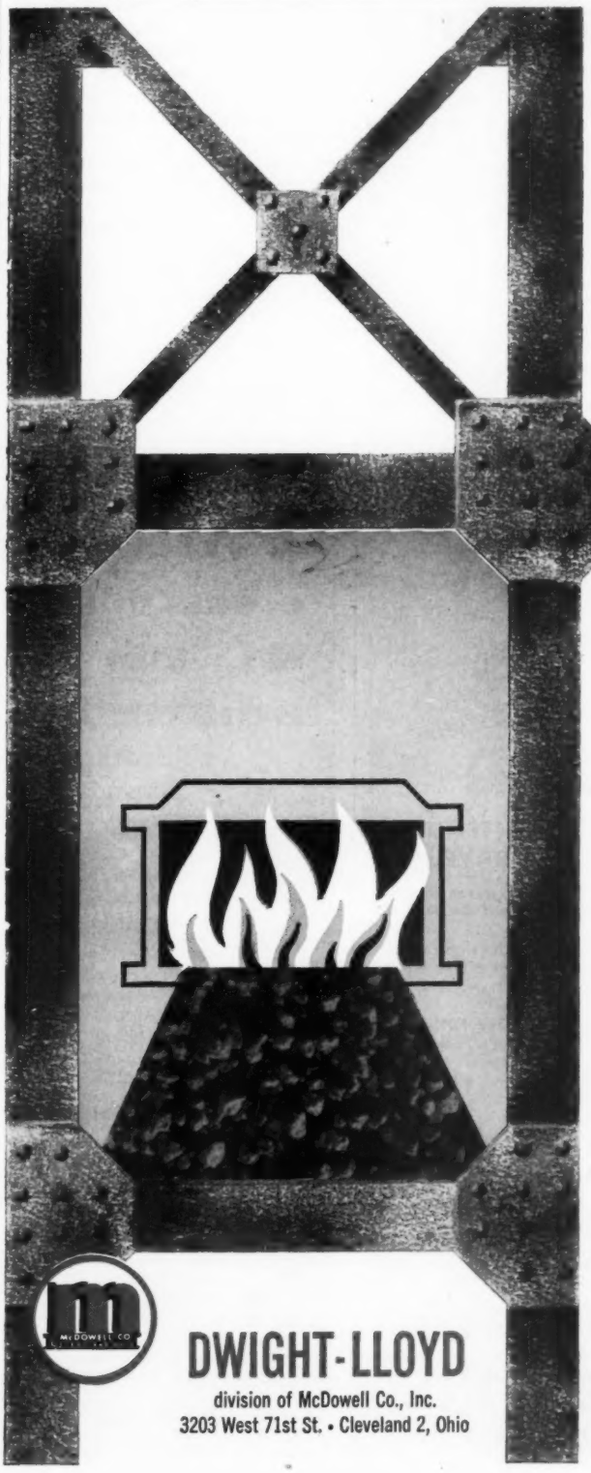
By 1954 work had progressed beyond proving ground tests, and ten tractors, built by hand, were placed in the field. Before the end of the year the D9X's had worked more than 16,000 hours on 37 different jobs. The tractors pulled logs and built logging roads in Washington, California, and Idaho; helped build Oahe Dam in South Dakota; and worked on the Ohio Turnpike and the Plattsburg, N. Y., Air Force Base, and dozens of other jobs around the country.

The D9 Emerges

The tractor that finally emerged is not only the most powerful tractor in production but is reported to be easy to operate and service. Caterpillar expects that the D9 will be used in virtually every track-type tractor application, and particularly in general construction, logging, pipe laying, mining, and quarrying. New attachments designed for the tractor include the No. 9S and No. 9A bulldozers, a push cup, and front and rear cable controls.

Although the tractor is big, it conforms to the other five models of Cat crawlers in general appearance. Ninety-inch gage, a 7-roller track frame, and fixed drawbar are stand-

(Continued on next page)



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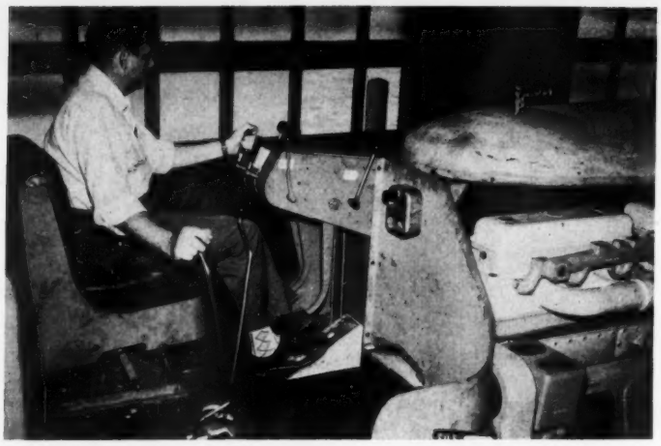

A Caterpillar engineer working with a wood mockup checks the operating convenience of the controls. Such tests led to the development of D9's console-type panel and helped determine the seat and control arrangements. ►

(Continued from preceding page)

ard. A console-type control panel, seat design and location, and careful arrangement of operating controls result in a flat, relatively open deck.

The diesel engine, which delivers 286 hp at 1,200 rpm for both the torque converter and direct-drive models, shows considerable attention to external appearance. Oil lines, fuel lines, and water tubes have been placed internally as much as possible.

Features of the engine include: short valve push rods, possible because the camshaft is high in the block; stationary oil jets that provide a continuous stream of oil to cool the pistons, the camshaft, and followers; and steel-backed aluminum bearings with the lower half of the center main bearing to take the camshaft thrust on a flange-type bearing. There is a 6-volt electric starter for the two-cylinder starting engine.

The D9 burns No. 2 fuel oil with a minimum cetane rating of 35, and does not require premium diesel fuel.

All accessories are driven from a gear at the rear of the crankshaft to minimize torsional vibration. The constant power drive for rear-mounted equipment such as cable controls, provides power whether or not the flywheel clutch is engaged, and when the torque converter is operating at lowest speeds.

Pressure lubrication and full-flow filtration are provided in the engine, the transmission, steering-clutch release booster, and in each final drive. It is provided also for the oil clutch and starting engine.

The torque converter is a three-stage 5:1 torque-multiplication unit that uses diesel fuel for hydraulic fluid. The flywheel clutch used with the torque converter is a 19-inch single-plate dry type. Torque-converter-fluid cooling is provided by a water-type heat exchanger mounted on the right-hand side of the engine. Speeds up to 7.8 mph, with three speeds forward and two in reverse, are provided by the torque converter drive. The direct drive has six speeds forward and six in reverse, and these range from 1.6 to 6.8 mph.

Welded fabrication of the steering-clutch case and main frame gives the entire tractor assembly a rugged backbone to withstand severe service. A one-piece welded track roller frame includes a closed oil-type recoil-spring housing and track guiding guards at each end of the frame.

Designed with the comparatively heavy weight of the D9 in mind, a seven-roller track frame provides good flotation and stability. The front idler is an adjustable fabricated-disk type. The standard track shoe, heat treated for wear resistance and strength, is 24 inches wide. There are 43 shoes to each track. With 129¾ inches of track on the ground, the D9 has a total ground contact of 6,228 square inches. Twenty-seven and 30-

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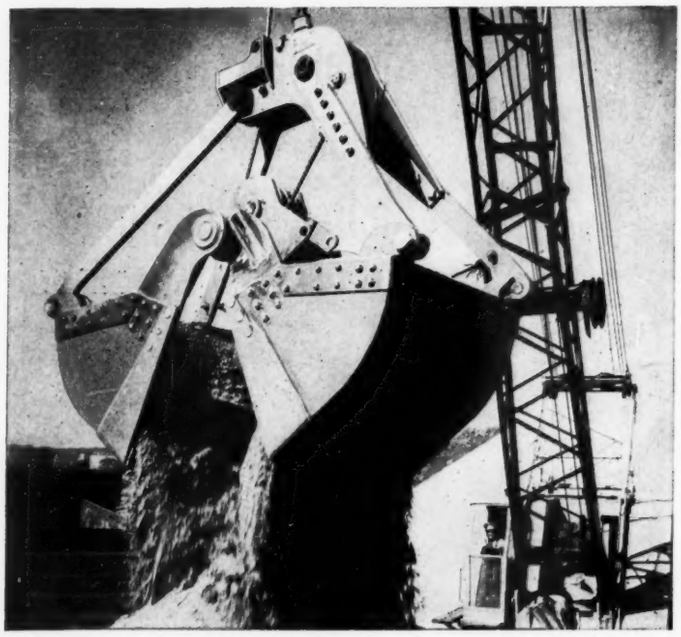

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inch shoes are available as optional equipment.

Condensed specifications

Drawbar hp: 230.
Engine hp at flywheel: 286.
Engine: 6¼ × 8 six-cylinder four-cycle diesel.
Maximum drawbar pull: 60,860 with conventional transmission.
Travel speeds: Up to 7.8 mph; 3 forward and 2 reverse with torque converter; up to 6.8 mph; 6 forward and 6 reverse with standard drive.
Standard transmission: Unit construction; selective-gear type.
Clutch: Oil-type.
Torque converter: 3 stage 5:1 torque multiplication; dry-type clutch.
Fuel: No. 2 fuel oil (ASTM Spec. D396-48T).
Starting Method: In seat; electrical; two-cylinder, gasoline-starting engine.
Length: 17 feet 10¾ inches.
Width: 9 feet 11¼ inches.
Height: 8 feet 9 inches.
Gage: 90 inches.
Approximate operating weight: 56,000 pounds with standard transmission, 56,650 pounds with torque converter.

For operating convenience the deck has been cleared of all but the most essential controls. Starting-engine controls are readily accessible from the seat. Oil clutch, steering clutches, and brakes are power assisted for ease of operation. To make servicing easier, major components have been designed so that they can be removed without disturbing other mechanisms.

Safety features include locks on both brake pedals, and pumps mounted on the rear of the engine to provide constant power for hydraulic actuation of brake and clutch boosters.

A new 750,000 square-foot plant at Decatur, Ill., is nearing completion to make room for full scale production of the D9 at Caterpillar's Peoria, Ill., plant.

For further information write to Caterpillar Tractor Co., Peoria 8, Ill., or use the Request Card at page 18. Circle No. 954.

Punched-Card Machines Lower Management Costs

■ Details on how contractors can get more use from punched-card record-keeping methods is described in a folder from Remington Rand Inc., 315 Fourth Ave., New York 10, N. Y.

The complete line of Remington Rand punched-card machines is listed in easy reference-chart form. The folder shows their use in the preparation of necessary records for billing, receivables, sales, payroll, and production.

The new folder also explains how punched-card machines and methods provide more speed, information, versatility, and economy in securing vital financial and operating reports.

To obtain Folder TM 930 write to the company, or use the Request Card at page 18. Circle No. 870.

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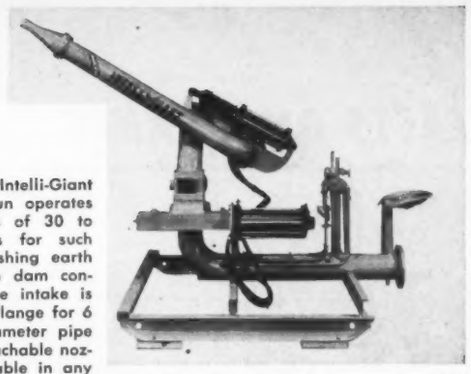

The Chiksan Intelli-Giant hydraulic gun operates at pressures of 30 to 300 pounds for such uses as washing earth and rock in dam construction. The intake is a standard flange for 6 to 8-inch-diameter pipe and the detachable nozzle is available in any size up to 4½ inches. Horizontal coverage is 320 degrees and vertical coverage is 120 degrees. Remote controls available for the unit make it possible for one operator to control one to several hydraulic guns from a distance. For further information write to Chiksan Co., Brea, Calif., or use the Request Card at page 18. Circle No. 914.

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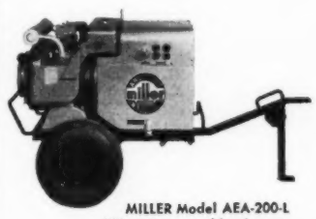

MILLER Model AEA-200-L 200 ampere combination a-c welder/power plant mounted on road towing trailer.

MILLER Model DEA-300-L 300 ampere combination d-c welder/power plant mounted on road towing trailer.

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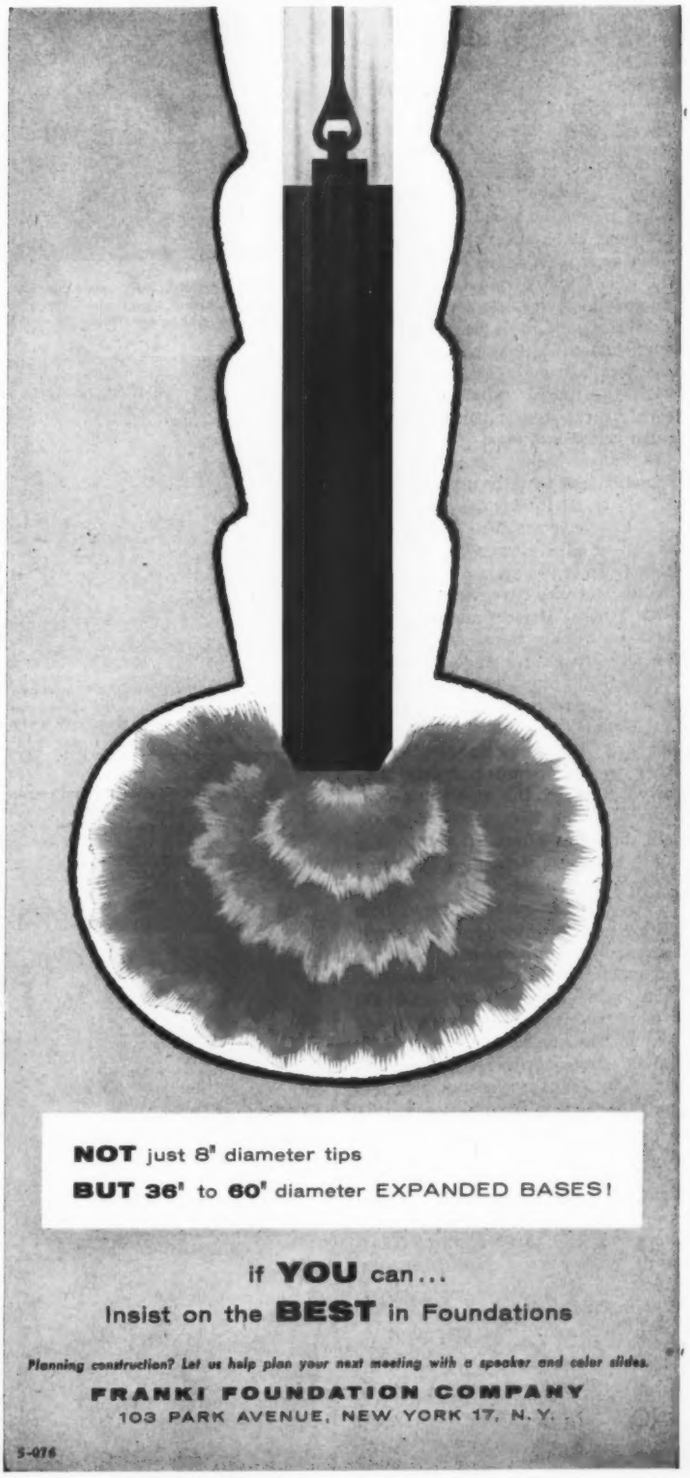

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FACTS ON FINANCE

A more dependable flow of money for heavy construction has started within the past month, and it shows signs of continuing for some time. The first inkling that ready money was available came early last month when the "Bond Buyer" interest-yield index went down three basis points on a 20-bond tabulation. One of the reasons for the fall was the unexpected demand for $60,850,000 worth of Massachusetts State Bonds on a 1 to 2.30 per cent income basis the first week in April. It was given a further boost by the keenly competitive sale—to an investment banker syndicate—of $111,980,000 assorted new Housing Authority bonds at the 2.4 per cent average interest yield. Municipal bonds in general are being so well received by investors that an actual "shortage" of long-maturity issues is believed possible.

Commercial banks, which have shied away from public securities for the past couple of months, are now coming to favor municipal bonds. Estimates now place new state and municipal obligations bought during the first quarter of 1955 at $1,400,000,000,—a total fully more then equal to the record figures for the same period last year.

A danger signal for heavy construction and other contracting work is felt to be in the so-called "easy credit home boom". This development is viewed as a menace by the joint committee of two great life insurance bodies, and they have urged Congress and Federal Reserve authorities to take restraining steps. As an initial result, perhaps, the Federal Reserve "rediscount rate" has been hiked from 1¼ per cent to 1½ per cent in the Kansas City District. This means higher priced money for banks when they borrow from the Federal Reserve. Whether this tightening continues or not, the extended credit situation may affect the contracting field, causing a tightening of closing of sources of money.

The less-than-expected rise in those liquid savings which form a reservoir of capital for investment is proving disappointing to watchful construction firms. Disappointing also are "marginal accounts" with impaired rating. The number of these accounts in the first quarter are higher than the total for this time last year, according to credit organization reports. Failures, while still below the 1954 total, are inching up week by week. Business debts, mortgage foreclosures, and life insurance cash-ins, together with the uncertain machine tool situation and the lessening of federal outlays are causing some concern. All these things may only be the prelude to an era of rapid expansion. But in any case, they are definitely not signs of an impending disaster.

Increased industrial construction is getting added impetus. One state after another is sponsoring the formation of "development companies" designed to foster the location and expansion of business and industry within its borders. New England has demonstrated the worth of such organizations, and the Empire State has set up The New York Business Development Corp. to be financed by banks and investment houses. Its funds will be pooled on a share-the-risk basis.

More economic developments favoring construction activity have been taking shape this past month:

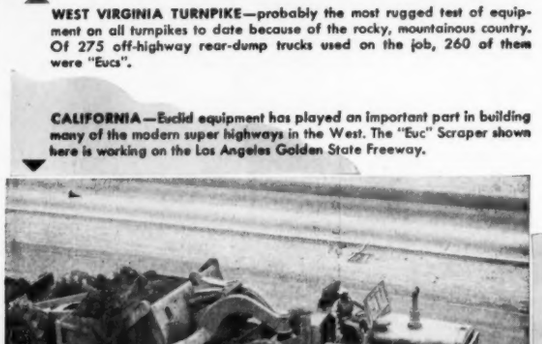
1. Corporation bonds, helpful to heavy expansion, are now selling well. A recent typical day saw a $108 million total for such diverse purposes as atomic propulsion, pulp mills, pipelines, steel, public utilities, and gas transmission.

2. Construction investment funds are being liberally reinforced by premiums from new life insurance presently written at a monthly rate

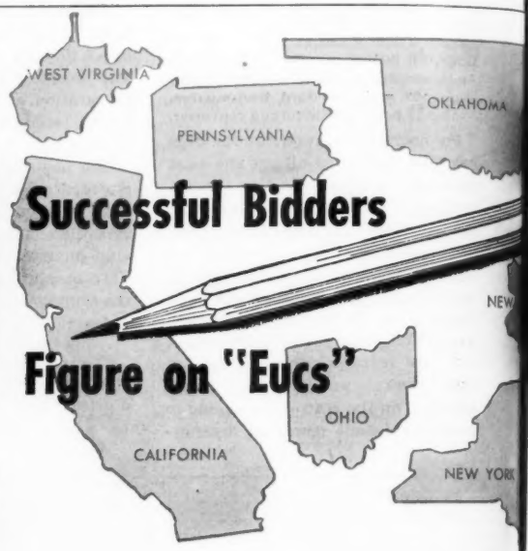
NEW YORK THRUWAY—more than 500 "Eucs" of all types—Rear-Dumps, Scrapers, Bottom-Dumps and Loaders helped rush many sections of this 427 mile road to completion.

WEST VIRGINIA TURNPIKE—probably the most rugged test of equipment on all turnpikes to date because of the rocky, mountainous country. Of 275 off-highway rear-dump trucks used on the job, 260 of them were "Eucs".

CALIFORNIA—Euclid equipment has played an important part in building many of the modern super highways in the West. The "Euc" Scraper shown here is working on the Los Angeles Golden State Freeway.



OHIO—Bottom-Dumps and Euclid Loaders dominated the construction scene on the Ohio Turnpike. "Eucs" outnumbered all competitive rubber tired earth moving equipment by better than 4 to 1.



Successful Bidders Figure on "Eucs"

On almost every section of every turnpike project there has been mighty keen competition for the jobs—usually 10 or more bidders. When your competitors are using "E" to move dirt or rock faster and cheaper, you just can't afford to pass up the cost-cutting advantages of Euclid equipment. That's why successful bidders on hundreds of earth moving projects base their estimates on the production performance of Euclids.

Money-making performance on all types of work is proved by the fact that over 60% of all Euclid equipment sold is repeat business from satisfied users.

FOR TOUGH ROCK JOBS...

and other heavy excavation, Rear-Dump "Eucs" are the logical choice as they were on the West Virginia Turnpike by more than 9 to 1. Capacities range from 10 to 50 tons with engines of 125 to 600 h.p., with some models equipped with Torqmatic Drive.

FOR BIG YARDAGE PRODUCTION...

the Loader and Bottom-Dump combination has no equal for high speed loading and hauling of earth and free flowing material. Bottom-Dumps have struck capacities of 13, 17 and 25 cu. yds. with loaded top speeds up to 35 m.p.h.

FOR SCRAPER JOBS...

big or small, there's a complete line with struck capacities of 7, 12, 15.5 and 18 cu. yds. High production and dependable job availability of "Euc" Scrapers has made them the fastest growing line in the industry. The "Twin Power" Scraper shown at the left has exceptional versatility—has been a one-man earth moving spread on lots of jobs!

There are lots of reasons why the men who know equipment use "Eucs" but they all add to this simple fact:

EUCS MOVE MORE LOADS PER HOUR AT THE LOWEST COST PER TON OR YARD

by WILLIAM HURD HILLYER

of better than $3,300,000,000—half a billion faster than last year's pace.

3. Bank clearings are above 1954's figures, indicating an increase in business activity.

4. New incorporations, averaging more than 12,000 a month, are 33 per cent ahead of '54.

5. The Tennessee Valley Authority has found a way to bypass federal debt limitations, through a proposed method similar to that for the $101 billion federal highway plan. Should the plan be used, financial channels will be opened up for vast new hydro-electric projects.

6. Steel operating output is averaging higher than 94 per cent capacity as compared with 68 per cent a year ago.

7. Industrial production and "gross national product" have shown a much greater rise than anticipated. Industrial production is 10 points higher than last summer, while gross national product is $6½ billion more than last year, according to the Guaranty Trust Co. of New York index-computation.

8. Manufacturers' inventories, $4½ billion below 1954's high, are holding steady despite increased industrial output.

9. Unemployment is dwindling in 149 major areas, and the U. S. Department of Labor foresees a further decline.

10. The public is more willing to put money into circulation, a joint Federal Reserve and University of Michigan survey discloses.

Instead of operating in a period of contraction and recession, as was predicted by many economists after the New Year, large and small businesses are in the midst of an expansion. The remaining eight months of the year are now being viewed with increased confidence. Both the U. S. Department of Commerce and the Securities and Exchange Commission feel 1955 will be a $27 billion capital outlay year for American industry. This total is several million above 1954 figures, and a large slice of it is expected to be used for heavy construction. THE END

It's "Eucs" on the Indiana Turnpike now!

First contract on the Indiana Turnpike covering a 7.4 mile section was awarded to Rieth-Riley Construction Co. Grading is being done by Chapin & Chapin of Norwalk, Ohio—over a million cubic yards are to be moved. In the photograph, one of a fleet of 8 Euclid 15.5 cu. yd. Scrapers is shown working on an overpass northwest of South Bend.

Euclid equipment was used by most of the contractors who built our first super road — the Pennsylvania Turnpike — more than 15 years ago. Since that time "Eucs" have been the choice of contractors for grading work on just about every superhighway project from Maine to California.

The new Indiana Turnpike is no exception—Euclids will be used on nearly all of the grading contracts awarded to date. In fact, "Eucs" already outnumber competitive rubber tired equipment by a wide margin and many more will go to work when the job moves into high gear.

Men who bid these big jobs can't gamble on the selection of equipment — they have to play it safe with machines they can depend on to do the most work at the lowest overall cost. Even if you don't bid on these big projects, the same dependable low cost performance of "Eucs" can mean more profits — and more jobs — for you. Call your nearby Euclid dealer for help with any earth moving problems — he's at your service to help you make more money on every job.

"Eucs" paid off in performance on all of these toll road projects:

NEW YORK THRUWAY
PENNSYLVANIA TURNPIKE
NEW JERSEY TURNPIKE
MAINE TURNPIKE
OKLAHOMA (TURNER) TURNPIKE
WEST VIRGINIA TURNPIKE
OHIO TURNPIKE

and on other highway jobs all over the world.

EUCLID DIVISION
GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

Euclid Equipment
FOR MOVING EARTH, ROCK, COAL AND ORE

GM GENERAL MOTORS

Line of Electric Plants

■ A new catalog illustrating the complete line of 23 Gen-A-Matic electric plants is available from Multi-Matic Corp., 14741 Bessemer St., Van Nuys, Calif. The Gen-A-Matic plants include both ac and dc models ranging from 275 watts dc and 850 watts ac to 5,000 watts dc and 12,500 watts ac.

The dc units are flat-compounded plants designed so that a constant voltage is maintained from no load to full load. For application on universal motors or portable power tools, these units offer an advantage in that they require less starting current than ac types.

The ac plants, which generate power like that transmitted from most central power stations, also provide 100 to 200 watts dc for charging batteries.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 884.

Instructions on Use Of Concrete Fasteners

■ The first of a series of instruction folders on its line of expansion anchors which can be fastened to masonry, concrete, and cinder block has been released by Diamond Expansion Bolt Co., Garwood, N. J.

The Diamond Hammer Drive anchors are a one-piece aluminum-alloy shell with a specially-made rust-proof nail. They are made in 13 sizes ranging from 3/16 × ⅞ to ½ × 3½ inches.

The Booklet tells where to use DHD anchors, the sizes to use for particular purposes, and how they are inserted.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 844.

Working in the northbound section of the thruway, an Allis-Chalmers HD-20 front-end loader fills a dump truck with material to be hauled away. The northbound service road will be located atop the berm at right.

C&E Staff Photos

Three miles for $15 million

By ANTHONY N. MAVROUDIS, Field Editor

Limited width, built-up area, traffic, and utilities present problems on short stretch of N. Y. Thruway

One of the last sections of the New York Thruway still to be completed is a three-mile stretch through Westchester County, north of the New York City line. This particularly difficult section is scheduled to be finished by the summer of 1956. While the roadway is short in length, it is particularly expensive to construct because of a surrounding built-up area that narrowed the choice for a right-of-way to practically one location.

The $15,400,000 project, started last July by a joint venture of Corbetta Construction Co., Inc., New York, N. Y., and Yonkers Contracting Co., Inc., Yonkers, N. Y., is divided into three stages. First-stage work—at present 20 per cent complete—includes all construction that can be done without disturbing traffic on Central Park Avenue, the existing artery on the thruway right-of-way.

From the very beginning of the job, it was evident that prepared progress schedules could not be maintained unless close timing was observed, for the contractors have to maintain traffic, relocate existing utilities, build 14,000 linear feet of retaining wall, and erect eight bridges to carry the thruway under and over existing streets. An advantage for the contractor was the fact that the surfaced Central Park Avenue could be used as a haul road during stage 1 work.

One of the first jobs is the removal of 240,000 cubic yards of peat muck. Two Lima draglines are making cuts averaging 40 to 45 feet, and up to 56 dump trucks at the peak of operations haul the muck to the Yonkers city dump. Approximately 100,000 cubic yards of muck remains to be excavated, and this will be saved for use as topsoil in landscaping.

The excavated area is being backfilled with rock obtained from other parts of the job. This backfill material is excavated by five Northwest 80D shovels and hauled by a fleet of 18 Euclids, while 18 wagon drills prepare the rock for blasting.

Operations of the many spreads of equipment on the job are coordinated by 20 Motorola mobile radio units located along the 3-mile stretch. The system keeps superintendents and the project manager constantly informed as to progress on the job.

Retaining Walls

Since the three-lane roadways and the service roads are at different elevations, 14,000 linear feet of retaining wall is required. The thruway

Figure The Job Lower If You're Using A LoDaL TRUCK SELF-LOADER

FORWARD TILTING BUCKET on the LoDaL unit may swivel, but rather than [illegible]. Big ¾-cubic-yard bucket lifts up to 3,000 pounds and reaches well into receiving truck body to dump. Bucket cleans out every time.

You'll Need Less Equipment
One truck with a LoDaL self-loads, hauls, dumps

You'll Need Fewer Workmen
One man takes the LoDaL to the job and loads

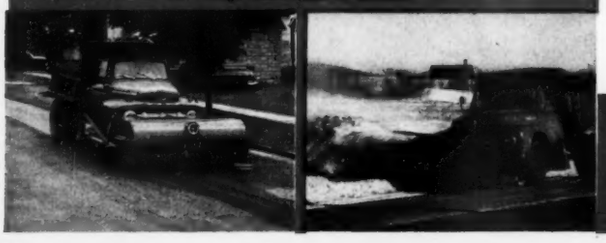
You'll Save Man and Equipment Hours
One LoDaL will pick up scattered yardage efficiently

And the versatile LoDaL will cost you a fraction of the price of single-purpose loaders

NEW GRAPPLE BUCKET on the LoDaL closes [illegible] tight by hydraulic power. The LoDaL grapple bucket gets a full load without pushing the pile, making the unit especially useful for picking up stockpiled materials. As the grapple closes, the cutter bar strikes the ground 13 inches ahead of the grapple lip, drawing the material into the bucket.

STOCKPILING AND NATURAL BANK LOADING are routine work for the sturdy, powerful LoDaL. Hydraulic power, controlled from the cab, lifts the big bucket overhead to self-load a 5-yard truck body in 2½ minutes. LoDaL can load sand, gravel, crushed rock, ashes or refuse.

LoDaL ATTACHMENTS convert the basic LoDaL machine into a self-loading REFUSE COLLECTOR, PICK-UP TYPE ROAD BROOM, SNOW PLOW, or SNOW LOADER. Unskilled workmen can change attachments in minutes.



LoDaL TRUCK SELF-LOADER

will fit any truck to do hundreds of jobs efficiently, quickly. It will dig, load, carry, grade, backfill, sweep, collect refuse, pick up piles of leaves, and remove snow. The multi-purpose LoDaL will handle costly operations at a fraction of the cost of other methods. And always—one machine and one man do the job.

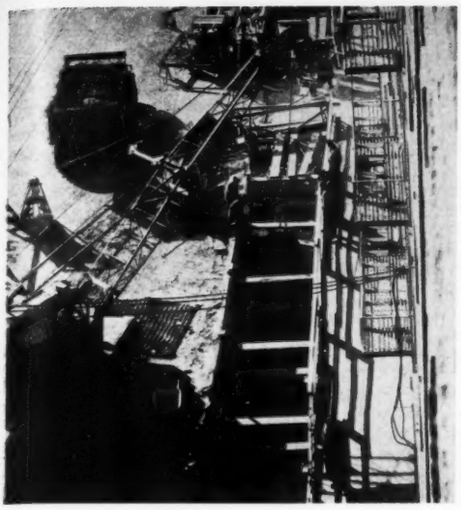
The basic LoDaL machine is a powerful loader with a lifting capacity of 3,000 pounds. Built to safely absorb all the thrust your truck is able to give, the LoDaL has plenty of pull-out power to maintain a fast loading speed, digging out a full bucket every time.

The load swings overhead in a smooth arc under continuous hydraulic control. The operator controls the loading with a single lever in the truck cab.

Offering unmatched economy in short haul and scattered yardage operations, the LoDaL will outperform on many jobs any wheel tractor loader available.

Multi-Purpose LoDaL Hydraulic Truck Self Loaders

LoDaL, Inc.
Norway, Mich. • Mars, Penna.



Preparatory to blasting for the 12-inch storm and 24-inch sanitary sewer at the south end of the right-of-way, a P&H crane places a steel mat in the trench. Extra care is taken with drilling and blasting here because of a 138,000-volt power line located 5 feet away.

A P&H crane, placing concrete for a retaining wall, loads its Insley 1½-yard laydown bucket from a Jaeger 5½-yard ready-mix truck. In the background is part of the retaining wall already constructed.

will run between the retaining walls, and the service roads will be located on the fill outside of the walls. Variations of subsurface strata require different types of footings for the retaining walls. During excavation, the contractor found that some walls could be placed directly on bedrock while other walls would require piles or spread footings for support. The walls, consisting of a 6-inch reinforced-concrete slab, reach heights of 28 feet in some places.

The thruway itself will consist of a 9-inch reinforced-concrete slab with one 13-foot and two 12-foot lanes per roadway. Service roads will consist of an unreinforced 7-inch concrete slab with two 15-foot lanes for each roadway.

Central Park Avenue, located on the southbound side of the thruway, is carrying two-way traffic while the northbound retaining walls, service roads, and thruway section are being built. The piers for eight structures to carry street traffic over the thruway are being built without disrupting traffic.

The second stage of the operation will start when the northbound section of the service road is completed. The service road will carry traffic now using Central Park Avenue, permitting work to start on the southbound portion of the thruway.

The third phase will begin when the southbound retaining walls and service roads are completed. This phase will see the paving of the thruway section and the completion of the eight bridge structures.

Concrete

Concrete for the retaining walls and bridge piers is being supplied by Colonial Sand & Stone Co., New York, N. Y., which has located its batch plant on the north end of the right-of-way. Approximately 150,000 cubic yards of ready-mix concrete for these structures is being placed by a fleet of cranes equipped with Insley 1½-yard laydown buckets.

The plant will also supply 70,000 cubic yards of concrete for the paving, scheduled to start this month. Concrete placing will continue through this season and next, and the contract will be completed in July or August, 1956. Normal rehandling costs on the entire project have been held down by two Ross Carriers which pick up, transport, and unload forms and other material.

(Concluded on next page)

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There are *more* reasons why the right grade of JET LUBRICANT and other Sinclair products can improve your operations. Why not let a Sinclair Lubrication Engineer help solve *your* lubrication problem. *There's no obligation.* Contact your local Sinclair office or write Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N.Y.

SINCLAIR JET LUBRICANT

Edward J. Petrillo, left, head of Yonkers Contracting Co., talks over some job problems with Roger H. Corbetta, right, president of Corbetta Construction Co., and James B. Lyttle, center, project manager for the joint-venture firm.
C&E Staff Photo

(Continued from preceding page)

One troublesome segment of the project was the excavation for the 12-inch storm sewer and the 24-inch sanitary sewer which parallel a 138,000-volt power line at the south end of the right-of-way. The 9-foot-wide trench, varying from 8 to 12 feet in depth, runs just 5 feet from the line feeding Westchester County. This line's cable has an oil jacket and porcelain joints, and care was exercised in the drilling and blasting to prevent damage.

Personnel

James B. Lyttle of the Corbetta Construction Co. is the project manager of the joint-venture. Edwards, Kelcey & Beck, New York, N. Y., consulting engineering firm on the job, has Robert Olsen as resident engineer. THE END

No Drilled Piles Here

To the Editor:

CONTRACTORS & ENGINEERS

Our attention has been called to an article published in the March issue of CONTRACTORS & ENGINEERS entitled "Economy and the Drilled Pile".

Contrary to the statement "specialized piledriving firms like Raymond Concrete Pile Co. now have drilling machines on their equipment rosters", we would like to advise that the Raymond Concrete Pile Co. does not install so-called drilled piles and therefore has no equipment for that purpose.

Very truly yours,
D. W. Moss, vice president
Raymond Concrete Pile Co.
New York 6, N. Y.

Army Engineer Officers Are Assigned New Posts

Two district engineers and a new commanding officer appointed for the Granite City Engineer Depot, U. S. Army Corps of Engineers, will assume their duties on July 1.

Col. William H. Lewis, now attending the Army War College, Carlisle Barracks, Pa., will succeed Col. Charles T. Tench as district engineer at New Orleans, La. Col. Harold E. Sprague, now stationed in the Far East Command, will become Pittsburgh, Pa., district engineer. He will replace Col. Ralph A. Lincoln, who is retiring from active service.

The commanding officer of the Granite City Engineer Depot, Granite City, Ill., will be Col. Carl M. Sciple. Now attending the Industrial College of the Armed Forces, Col. Sciple will succeed the retiring Col. Leland B. Kuhre as commanding officer.

Photogrammetry Unit Elects Sidney Park

The president of Park Aerial Surveys, Louisville, Ky., W. Sidney Park, was elected president of the American Society of Photogrammetry at its 21st annual meeting in Washington, D. C. Mr. Park, the designer of the Park precision mapping camera, is a charter member of the society and has served as a director and member of the Photomapping Specification Committee.

Other officers elected were William C. Cude, first vice president; and Kenneth E. Reynolds, second vice president. Mr. Cude is chief of the topographic engineering department at the Engineering Research and Development Laboratories at Fort Belvoir, Va., and Mr. Reynolds is manager of the defense contracts department of Bausch & Lomb Optical Co., Rochester, N. Y.

Thew Assistant Treasurer

The Thew Shovel Co., Lorain, Ohio, manufacturer of the Lorain line of construction machinery, has named Ralph A. Reynolds to the post of assistant treasurer. Starting with Thew in 1920, Mr. Reynolds has held posts in the accounting, credit, service, and sales departments, and has served both as mid-Atlantic and federal district sales manager.

New Wayne Representative

Don Mansfield is the new Central District representative for the Wayne Shovel & Crane Division of American Steel Dredge Co., Inc., Fort Wayne, Ind.

LOAD with the Model 543. Travels from job to job at 15 m.p.h. Trims highest, longest trucks or trailers. Trims to load to full capacity every time. Capacity: to 3 cu. yd. per min.

LOAD at lowest cost.

LOAD rapidly from stockpile, bank or windrow — keep trucks on the move.

LOAD, screen or strip topsoil at top efficiency.

LOAD easily—simple operation allows driver to load his own truck.

LOAD sand, gravel, coal or snow.

LOAD from windrow at 4 cu. yd. per min. with the Model 550 Windrow Loader. Handles snow at 7 cu. yd. per min. Keeps ahead of trucks normally available. Turning radius: only 8', 6".

LOAD with the Model 82A for sure footing on unstable bases. Complete accessories for loading, scalping and screening simultaneously. Capacity: 3 cu. yd. per min.

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CONVENTION CALENDAR

May 12-13 Symposium on Automation

Centennial Symposium, sponsored by School of Engineering, Michigan State College, on campus, East Lansing, Mich. Professor W. I. Kenerson, Department of Civil Engineering, Michigan State College.

May 31-June 1 National Rivers and Harbors Congress

Forty-second Annual Convention, Mayflower Hotel, Washington, D. C. William H. Webb, executive vice president, NRHC, 1720 M St. N. W., Washington 6, D. C.

June 2-4 National Society of Professional Engineers

Annual meeting, Bellevue-Stratford Hotel, Philadelphia, Pa. Kenneth E. Trombley, NSPE, 1121 15th St. N. W., Washington 5, D. C.

June 7-10 American Welding Society

Third Annual Welding Show concurrent with Annual Spring Technical Meeting, Municipal Auditorium Kansas City, Mo. Joseph G. Magrath, national secretary, AWS, 29 W. 39th St., New York, N. Y.

June 13-18 American Society of Civil Engineers

Convention, Jefferson Hotel, St. Louis, Mo. Brice R. Smith, general chairman, c/o Sverdrup & Parcel, Inc., 1118 Syndicate St., St. Louis, Mo.

June 19-July 2 Material Handling Training Conference

Second Annual Conference, Lake Placid Club, Lake Placid, N. Y. James L. Bright, director, MHTC, 56 Robbins Road, Lexington, Mass.

June 20-22 School for Highway Superintendents

Session sponsored by Cornell University, on campus, Ithaca, N. Y. J. W. Spencer, highway research and extension engineer, Department of Agricultural Engineering, Cornell University.

June 26-July 1 American Society for Testing Materials

Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J. John S. Pettibone, assistant technical secretary, ASTM, 1916 Race St., Philadelphia, Pa.

June 27-29 American Society of Landscape Architects

Fifty-sixth Annual Meeting, Sheraton-Cadillac Hotel, Detroit, Mich. John I. Rogers, general chairman, ASLA, 906 Durant St., Lansing, Mich.

July 5-15 Conference on Soil Engineering for Airfields and Highways

Conference, sponsored by Massachusetts Institute of Technology, on campus, Cambridge, Mass. Summer Session Office, Room 7-103, MIT.

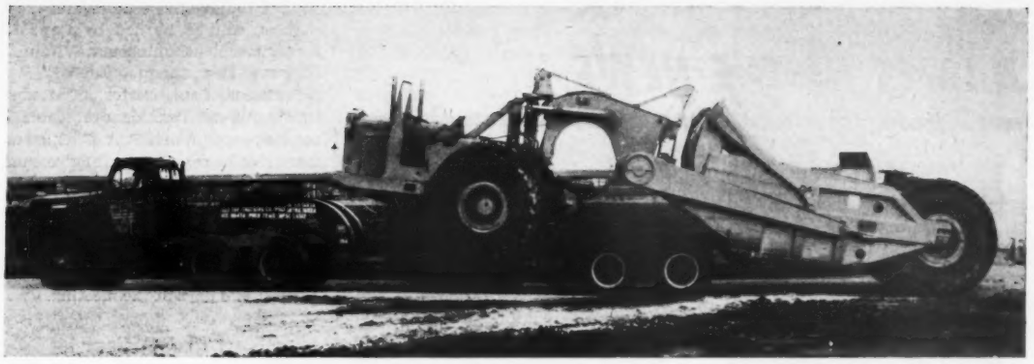
July 17-20 National Association of County Officials

Meeting, John Marshall Hotel, Richmond, Va. Keith L. Seegmiller, executive secretary, NACO, 1616 Eye St. N. W., Washington, D. C.

New Minnesota Branch Opened by Symons

A 6,000-square-foot warehouse and sales office to serve builders in the Minneapolis-St. Paul area has been opened by Symons Clamp & Mfg. Co., Chicago, Ill. Located at 6404 Cambrige St., St. Louis Park, Minn., the new facility will carry the Symons line of form ties, column clamps, shores, and shore accessories.

Lyle Schoffman is sales manager for the branch, Loran A. Theusch is in charge of the office and engineering department, and Clarence Urlaub is supervising assembly, maintenance, and shipping operations.



STANDARD Talbert removable gooseneck and axle units make it possible to interchange decks of various lengths and design, providing flexibility for carrying different types of loads. A Talbert Model TD-25-RG-RA trailer is shown carrying a Caterpillar DW21 scraper. In this case, the gooseneck and removable axle units are attached to a 13-foot deck with telescopic side extensions. For further information write to Talbert Construction Equipment Co., 7950 W. 47th St., Lyons, Ill., or use the Request Card at page 18. Circle No. 931.

Eimco Tractor Excavator in open pit mine. Loading capacity in this rugged rock pile is at the rate of 1500-1800 tons per shift per machine.

TOUGH LOADING

Eimco Tractors with Eimco excavating attachments are proved rock loading machines. This 1½ cubic yard tractor excavator has a digging force of 36,000 pounds at the bucket lip. Any other type of rock loading equipment of this capacity able to exert this digging force would require an investment of two to three times that of the mobile efficient Eimco loader.

Eimcos load faster (at the rate of 3 to 5 yards per minute in rock) even when working on uneven ground. They are easier to operate — only two small handles control all tractor movements and they are more maneuverable because they have independently controlled tracks so that one track can be run forward while the other runs reverse.

The Eimco Tractor mounts its loading attachment directly to the tractor frame inside the track assembly. This is a unique feature exclusive with Eimco. Only Eimcos have been designed with the superior strength to permit mounting attachments on the frame so that they will work longer than conventional tractors, with less down time and a minimum of maintenance attention.

Yes! The tough jobs can be easily handled by Eimcos. You can safely put them in against much larger, much more expensive equipment and watch them hold their own. In the job pictured above, where one bench of an open pit is being worked, the greatest difference is apparent in moving from bench to bench. The Eimco required four minutes. The larger, more expensive equipment requird half a day with all hands pulled off their drilling, shooting and dozing jobs to help.

Investigate the Eimco Tractor and its loading attachment. It will show you new ways to cut costs — be low on the next job.

THE EIMCO CORPORATION

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NAMES IN THE NEWS

Maj. Gen. George J. Richards, chief engineer of the Pennsylvania Department of Highways.

Three Appointments Fill Pennsylvania Highway Posts

The post of chief engineer of the Pennsylvania Department of Highways has been filled with the appointment of Maj. Gen. George J. Richards, U. S. Army, (ret.)

A native of Easton, Pa., Gen. Richards spent most of his army career in the U. S. Army Corps of Engineers following his graduation from West Point in 1915. He was in command of engineer units in Texas and Mexico before taking command of a combat engineers regiment in World War I. Later, he served as district army engineer in Mississippi, commanded a battalion of combat engineers in Panama, was district engineer for the U. S. Lake Survey district at Detroit, Mich., and commanding officer of a combat engineer regiment in California.

From 1950 to 1953, he served as chief of the Military Assistance Advisory Group in France. He holds the Distinguished Service Medal and Legion of Merit, and has been decorated with the rank of commander of the French Legion of Honor.

Two other vacant posts in the state highway department have been filled with the appointment of Robert A. Farley as assistant chief engineer in charge of maintenance and Edward D. Ellis as district engineer at Franklin. Mr. Farley, who will make his headquarters in the central office at Harrisburg, Pa., replaces N. A. Staples who resigned several months ago. A registered professional engineer and a graduate of Virginia Military Institute, Lexington, Va., Mr. Farley holds an MS degree in engineering from Case Institute of Technology, Cleveland, Ohio. Mr. Ellis succeeds Glenn D. Myers as district engineer at Franklin.

Bechtel Vice President

Edward J. Mahoney, Jr., has been elected a vice president of Bechtel International Corp., San Francisco, Calif., and of Compania Bechtel, South America. He will work from the San Francisco Headquarters as special assistant to S. D. Bechtel Jr., head of the pipeline division. Previously, Mr. Mahoney was head of Mahoney Contracting Co., Lansing, Mich.

International Road Group To Hold Meeting in Rome

Highway authorities from more than 60 countries are expected to attend the Second World Meeting of the International Road Federation October 2 through 8 in Rome, Italy, for a discussion of such subjects as financing, technical training, and social and economic influences relating to the international highway systems.

All sessions at the meeting will be conducted in English, Spanish, French, and Italian. The section on the training of highway and traffic engineers and of operators and mechanics, will be headed by Gen. J. A. Anderson, commissioner, Virginia Highway Department.

Professor Papi, rector of Rome University, will preside over the financing session, and F. A. C. Guepin, managing director of Shell Petroleum Co., London, England, will be in charge of the program on social and economic aspects of road development and highway transportation. A tour of Italian highways will be made on the last two days of the meeting.

Harrison Co. Officer

The new vice president in charge of all construction out of the home office of Harrison Construction Co., Pittsburgh, Pa., is N. T. Franklin. Mr. Franklin has been with the Harrison organization since 1931.

Col. C. H. Dunn Named New Executive of OCE

Effective July 18, Col. Carroll H. Dunn will become executive, office of the Chief of Engineers, U. S. Army. Col. Dunn, director of Waterways Experiment Station, Vicksburg, Miss., will replace Col. A. C. Welling, who will attend the National War College.

Other shifts in the Office of the Chief of Engineers include Col. Andrew P. Rollins, Jr., who will leave his post as assistant district engineer, Albuquerque, N. Mex., to take the post vacated by Col. Dunn. Col. George H. Walker will succeed Col. William Whipple as Executive, Civil Works, and Col. Robert R. Ploger, now attending the Army War College, will replace Col. P. C. Hyzer as chief of the Military Personnel Division. Lt. Col. Howard W. Penney, now sta-

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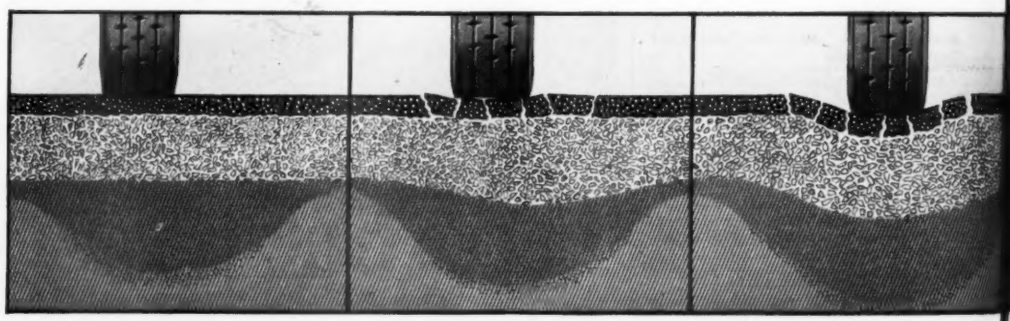
Sub-grade soil stabilization with the SEAMAN MIXER is economical, quick and easy to do — and adds years and years of life to the base course. It cuts maintenance so sharply that the dollars budgeted for road repairs will pay for many miles of new and better highways.

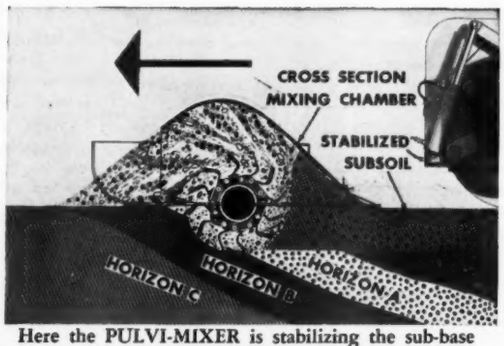
And, of course, if you up-grade the quality of your sub-base soil by mixing it with gravel or gravel and binder, your maintenance savings are proportionately larger and extend over an even greater number of years.



Sub-base failure is caused by soils of different natures reacting unevenly to moisture. Here a weak spot is developing in an *unstabilized* base. SEAMAN stabilization prevents this.

The breakdown of the soil in the sub-base through the disintegrating effect of moisture causes a localized movement and weakening in the base above.

As traffic pounds the base, cracks appear and the sub-base is weakened further by traffic loads and by permeation of additional moisture. The bridging effect of the base can no longer carry the load.



Here the PULVI-MIXER is stabilizing the sub-base by blending the different soils (soil horizons A,B,C) to attain a course which is uniform in moisture, density and thickness. Weak spots will not develop and the base above will withstand years of traffic punishment.

BLEND AND ASSEMBLE SUB-GRADE SOILS FOR MAXIMUM STRENGTH WITH THE SEAMAN

Sub-grade soils vary in physical characteristics and consequently in their reactions to moisture. It is their unequal movement and the presence of undesirable voids that cause heaving, pot-holing and breakup of the pavement. But one low cost pass with the SEAMAN blends and assembles those soils to uniformity in character and strength. This well-processed soil will reduce frost-boils, spring break-up and pavement failure.

tioned at SHAPE, will become assistant Chief of Civil Works for Flood Control, succeeding Col. A. D. Starbird, who will attend the National War College.

Dr. Hill Joins Ehasz As Senior Consultant

A former Connecticut state highway commissioner, Dr. G. Albert Hill, has joined Frank L. Ehasz & Associates, consulting engineering firm of Long Island City, N. Y. He will serve as senior consultant and research associate on highway matters.

Dr. Hill, past president of the Association of Highway Officials of the North Atlantic States and a former regional vice president of the American Association of State Highway Officials, will work in the company's new office in Hartford, Conn.

Moss Made Vice President Of Raymond Domestic Sales

The Raymond Concrete Pile Co., foundation and construction firm of New York, N. Y., has made Donald W. Moss vice president of domestic sales. Mr. Moss succeeds Rear Adm. Kirby Smith, CEC, USN, (Ret.) in the post. Excluding four years as director of construction of the U. S. Navy Bureau of Yards and Docks during World War II, Adm. Smith has been with the Raymond organization since 1926.

Texas Eastern Transmission Appoints W. M. Stephens

W. M. Stephens, an engineer for Texas Eastern Transmission Corp., Shreveport, La., has been appointed acting superintendent of construction for the company. In this job, Mr. Stephens will supervise the activities of communications, compressor station, electrical, materials and pipeline sections of the company's engineering department.

Before joining the company, Mr. Stephens was employed as an engineer with Brown & Root of Houston, Texas. Previous to that, he was associated with the Construction Service Co., and Hudson Engineering, both also of Houston, and the Pan American, Sinclair, Humble Oil, and Gulf refining companies.

N. Y. Firm Names Dodds Development Engineer

Robert H. Dodds has joined Lockwood, Kessler & Bartlett, Inc., consulting engineering firm of Great Neck, N. Y., as development engineer. Since 1948, Mr. Dodds was associate editor in charge of contracting and heavy construction for a McGraw-Hill publication.

Robert H. Dodds, development engineer with Lockwood, Kessler & Barlett, Inc., Great Neck, N. Y.

After being graduated from Iowa State College with a civil engineering degree in 1937, Mr. Dodds did a year's graduate work at Medill School of Journalism Northwestern University, then worked on defense construction in the midwest before joining the U. S. Navy as a Civil Engineers Corps officer.

While in service, he was on Naval contract construction duty in the New York area and spent a year and a half in the historical division of the U. S. Navy Bureau of Yards and Docks. Discharged from the Navy with the rank of lieutenant commander in 1946, he became associate professor of civil engineering at Colorado A & M College, remaining in that post until 1948.

Engineers Joint Council Has Lange as Secretary

E. Paul Lange, assistant secretary of Engineers Joint Council, New York, N. Y., has succeeded Brig. Gen. Stewart E. Reimel, USA (Ret.), Washington, D. C., as secretary of the organization. Gen. Reimel assumed the duties of secretary on a temporary basis in 1954.

Mr. Lange, a member of the American Institute of Mining and Metallurgical Engineers, was engaged in mining engineering in Idaho, Alaska, and South America before serving in the U. S. Army's Counter Intelligence Corp. in World War II. Following the war, he worked on a development program for the Saudi Arabian government and then served as company Engineer for C. Tennant Sons & Co., New York, N. Y.

Air Force Transfers Col. Winkler to Labrador

The former Sacramento District Operations Officer of the Air Force Installations Representative Office of the South Pacific Region, Lt. Col. Albert L. Winkler, has been assigned to duty with the Installations Engineer for Goose Bay, Labrador.

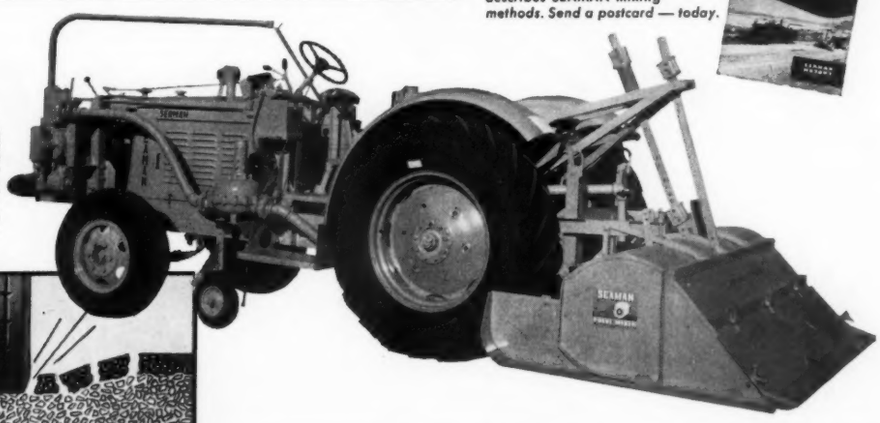
Since 1951, he has been in charge of expediting construction of Air Force Installations in northern California, Hawaii, and a number of islands in the Pacific. A civil engineering graduate of Pennsylvania State College, Col. Winkler has more than 22 years' service with the military reserves. He has been on active duty since September 1940, serving in England and in Germany.

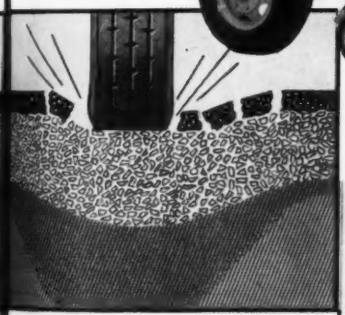
that will support a wearing surface!

PULVI-MIXER

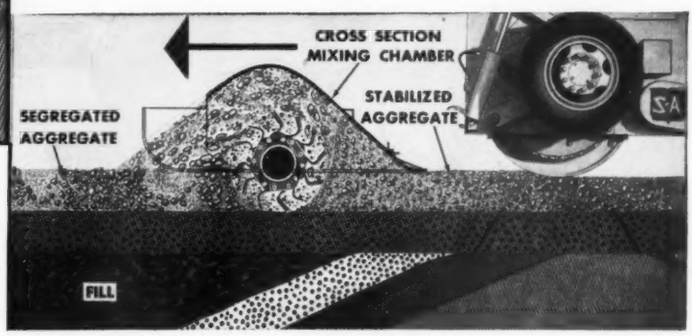
For a complete description of the SEAMAN TRAV-L-PLANT and the SEAMAN Self-Propelled PULVI-MIXER write for Bulletin TPS. It shows many field scenes and describes SEAMAN mixing methods. Send a postcard — today.

The Seaman TRAV-L-PLANT.
7 ft. mixing width; gasoline or diesel powered. Equipped with pump, tachometer assemblies, volumetric meter and spray bar for precision application of bitumen or water.





Complete breakdown of the base has started a chain reaction as more and more moisture permeates the fault and establishes repeated breakdown cycles along the width and length of the pavement.



. . . AND MIX THE BASE ITSELF WITH THE SEAMAN

No matter what materials — gravel, crushed stone, sand-clay, or native aggregates of any type; *no matter* what binders — bituminous, cement or chemical additives, — there is no equipment other than the SEAMAN that will blend, mix and assemble the materials so that the unstable segregation of coarse and fines is corrected. There is no other equipment that will so uniformly, quickly and completely distribute the binder throughout the mix. And SEAMAN-mixing costs are so low that only actual experience makes them entirely believable.

The SEAMAN PULVI-MIXER is processing the aggregates for the base course, correcting an always-present segregated condition — (the separation of coarse and fines). When the PULVI-MIXER has finished the work of blending and mixing the materials into a correct assembly, partially pre-compacted, the mix is ready for final rolling.

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New book applies geological data to civil engineering

Civil engineering practice and the more practical aspects of geology are integrated in a useful new book, "Geology in Engineering", published by John Wiley & Sons, Inc., New York, N. Y. Designed both as a text and as a practical reference, the book is the joint effort of a government geologist and a professor of geology.

Acknowledging the fact that "there has long been need for a book which introduces practicing engineers to phases of geology . . . most useful in their work" and "acquaints geologists employed in engineering work with engineering practice," the authors present a comprehensive and analytical treatment of geology from the viewpoint of its application in specific engineering projects.

Preliminary chapters discuss minerals, rocks, geological structure, subsurface water, and rock weathering and soils. The action and results of erosion, glaciers, frost, landslides, volcanoes, and earthquakes are given detailed treatment in later chapters. Considerable space also is given to geological aspects of dam, reservoir, tunnel, highway, and airfield design and construction.

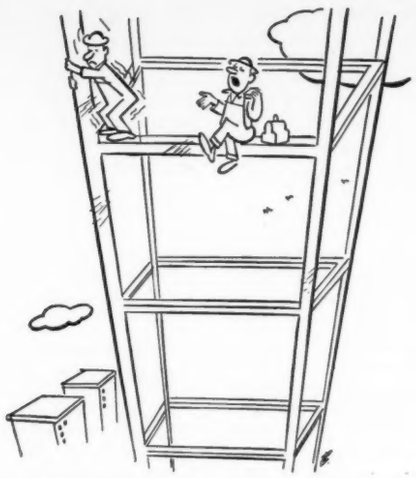
In addition to a chapter on soil mechanics by E. J. Yoder, research engineer at Purdue University, there are sections on the effect of frost on soils and aerial photographic interpretation of soils. Concrete aggregates are discussed in a separate chapter which considers types of aggregate, chemical stability and contamination, prospecting for aggregates, testing, and general geological principles relating to aggregates.

The book is recommended as the basis of a one or two-term course, and is particularly applicable for that use because the emphasis is on principles rather than case histories—although the latter are adequately represented. Discussions of the various subjects are thorough and, where necessary, elementary. Because generous treatment is given to each subject discussed, there is an absence of the highly technical language which would confuse the engineer not well versed in geology.

The more than 200 illustrations include photographs of rocks, soils, and other geological formations, diagrams of formations and engineering equipment, tables, aerial maps, and geological charts. Besides separate author and place-name indexes, there is a 24-page subject index.

The authors of this valuable new volume are John R. Schultz, chief of the geology branch at the Waterways Experiment Station, Vicksburg, Miss., and Arthur B. Cleaves, professor of geology at Washington University, St. Louis, Mo. Schultz, formerly with the U. S. Army Corps of Engineers, has done geologic-engineering work on every continent and in the Arctic; Prof. Cleaves has served as consultant on many engineering-construction projects and is a past chairman of the engineering-geology division of the Geological Society of America.

"Geology in Engineering", in a well bound, easily read edition, is priced at $8.75. Copies may be ordered from John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y.



"Of course I once had loftier ambitions."

Donald T. Heltzel, son of the present secretary of Heltzel Steel Form & Iron Co., is president and treasurer of General Road Machines, Inc., a new producer of highway-construction machinery.

New road-machine firm headed by Donald Heltzel

The newest producer of construction machinery, General Road Machines, Inc., Niles, Ohio, this month starts production of a newly designed concrete spreader which will be added to the line of forms for roads, curbs, gutters, and sidewalks, and concrete finishing machines in production since the firm started operations two months ago.

General Road Machines, Inc., was organized in March by Donald T. Heltzel, Jack J. Marcello, and Michael Hudis, following their resignation from posts with the Heltzel Steel Form & Iron Co., and its subsidiary, Flexible Road Joint Machinery Co., both of Warren, Ohio.

The new firm, with headquarters at N. Main St., Niles, Ohio, is producing its equipment at the plant of the Niles Machine & Welding Co., Niles-Warren Road. General Road Machines has purchased the plant and is sharing its use with Niles Machine temporarily. Last month, General Road Machines started operations at its second plant, located on Warren Road at Newton Falls, which has been purchased from Fox-Burch Machine Products Co.

At the present time, plans are underway to start work on an 18,000-square-foot addition to the Newton Falls plant. An expansion program, scheduled to start this summer, will provide the new company with a manufacturing facility in the southwest which will serve not only that section of the nation, but also South America. Production at this plant is expected to be under way early in 1956.

Donald Heltzel, the son of J. William Heltzel, present secretary of Heltzel Steel Form & Iron Co. and Flexible Road Joint Machinery Co., is president and treasurer of the newly organized firm. Mr. Heltzel, who formerly served as vice president and general manager of Flexible Road Joint and advertising manager for the parent company, said that General Road Machines, Inc., will not be in direct competition with either the Heltzel firm or its subsidiary. A graduate of Notre Dame University, Mr. Heltzel served as lieutenant j.g. in the U. S. Navy during World War II. After being discharged from service in 1946, he joined the Heltzel Steel Form & Iron Co.

Mr. Marcello, vice president and secretary of the new company, formerly was sales manager of Flexible Road Joint Machinery Co. Mr. Hudis, former shop foreman at Heltzel Steel Form & Iron Co., is vice president in charge of production for General Road Machines, Inc.

Dynamite Available in Long-Length Cartridges

■ New long-length small-diameter cartridges are now available for all types of Hercules dynamite, according to literature just released.

These cartridges make possible more uniform fragmentation through the discharge of a continuous column of explosive. They also offer savings in time and labor in loading blast holes.

The longer cartridges are available in 12, 16, 20, and 24-inch lengths, and in 1¼, 1½, 1¾, and 2-inch diameters.

To obtain this literature write to Hercules Powder Co., Inc., Wilmington 99, Del., or use the Request Card at page 18. Circle No. 806.

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Shell Research gives you new oil-change yardstick—

Now—operators can test crankcase oil in the short time allotted for refueling and crankcase oil checks. The Shell ADC Oilprint Analysis gives a practical and accurate oil evaluation in minutes.

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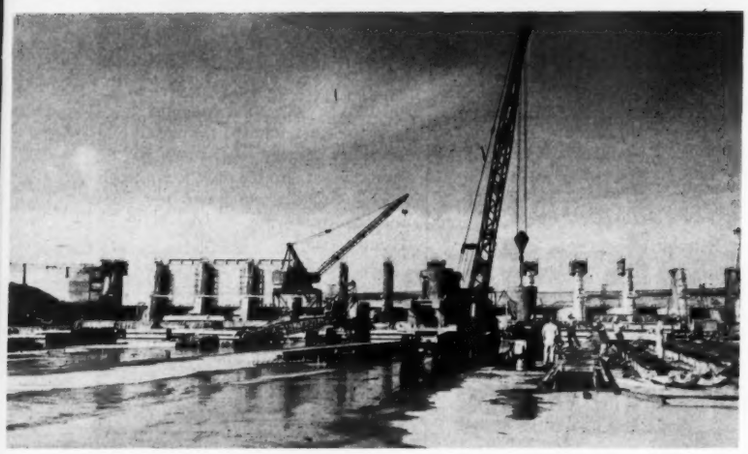
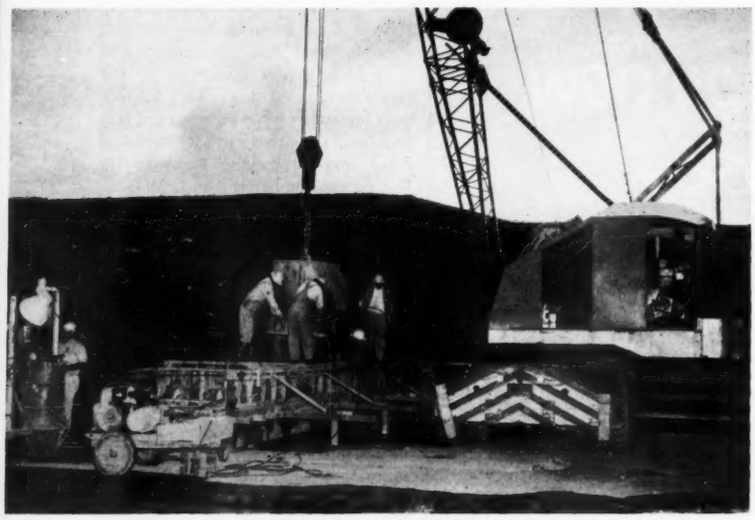
SHELL

Several types of prestressed beams and girders for the Garrison Dam bridge stand in various stages of completion on the 1,600-foot-long spillway chute. Water for curing, pumped 140 feet to storage tanks on the hill, is fed by gravity to the area.

C&E Staff Photos



Whenever possible, day crews place concrete for the beams. Here a Lorain truck crane picks a Gar-Bro 1-yard bucket off an International truck and swings it to one of the forms.



The night crew, which placed most of the concrete, makes a pour with an American truck crane and Gar-Bro 1-yard bucket. A Kohler light plant, left, provides illumination, and a Maginniss Hi-Lectric generator on a trailer supplies power for vibrators.

Spillway serves as casting bed for

Novel devices aid prestressing of precast-concrete units; gantry cranes erect girders and beams for Garrison Dam spa

One of the largest precast and prestressed concrete bridges in the country is so dwarfed by the magnitude of the great project of which it is a part that it seems almost insignificant.

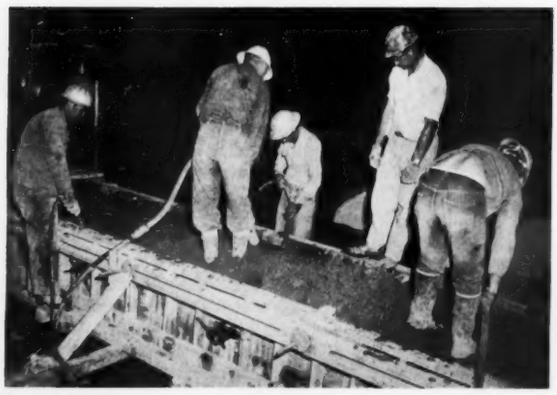
The massive Garrison Dam which blocks the channel of the Missouri River at Riverdale, N. Dak., has been described so often and in so many superlatives that it is already known to most Americans as one of the largest rolled-earth dams in the world. While it is not the largest of the Missouri River dams, the placing of its 68,000,000 cubic yards of earth embankment and 1,500,000 cubic yards of concrete represents a tremendous construction and engineering accomplishment.

The 32-span bridge, totaling 1,536 feet in length, is only a minor part of the $13,300,000 stage I spillway contract. While the bridge is one of the last items of that contract to be completed, work involved in precasting and prestressing operations makes it one of the more unusual aspects of the job.

General contractor for the spillway stage I is a joint venture known as Garrison Spillway Constructors. Sponsored by Johnson, Drake & Piper, Inc., Minneapolis, Minn., the venture also includes Foley Brothers, Inc., St. Paul, Minn.; C. F. Lytle, Co., Sioux City, Iowa; Donovan Construction Co., St. Paul; and Winston Bros. Co., Minneapolis. Construction of the entire Garrison Dam and reservoir project is under the supervision of the Garrison District of the U. S. Army Corps of Engineers.

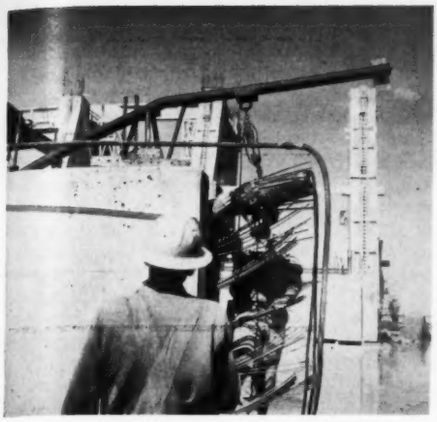
Designed to carry a live load of 200,000 pounds—which can be represented by a trailer carrying one of the big transformers to the powerhouse—the bridge spans the bays of the spillway's 28 tainter gates, plus two approach spans at each end. Piers which support the gates also provide bearing for the bridge. Each span is supported on a pair of prestressed-concrete girders, 47.33 feet long and 6 feet high, which are fixed at one end and free to expand at the other. The fixed end is held in place by two 1¼-inch dowels, while the free end rests on bearing plates.

The deck consists of 320 deck beams, each 4 feet wide, 2 feet thick, and 28.5 feet long, together with 64 deck stiffener beams which have the same outside dimensions. These beams lie across the girders in a transverse direction and are held in place by dowels which project from

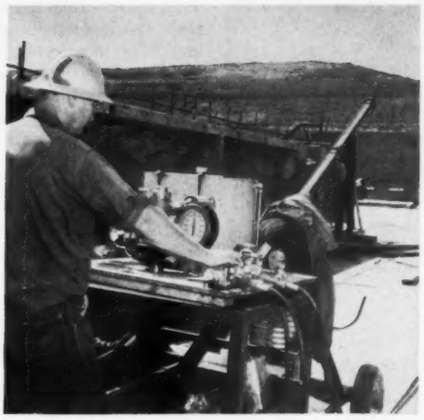


Viber, Dart, and Maginniss vibrators consolidate the stiff mix in the forms. The mix, coupled with reinforcing and prestressing cables in thin beam sections, made adequate vibration doubly important.

A workman opens the air valve to start a Viber pneumatic unit, held against the lower flange of a girder form by a Blackhawk floor jack. This external rig can be moved quickly to another location.



The topmost of a girder's seven cables—each of which has twelve 0.276-inch high-tensile wires—is prestressed by a Freyssinet jack. The jack is supported by an angle iron boom.



Once the jack is in place, air pressure for driving the hydraulic piston which pumps soluble oil and water to the jack is applied through this control unit. The gage indicates the amount of pressure.

Grout is forced under air pressure through a short piece of ¼-inch pipe to fill the remaining space in the conduit. When grout comes out the far side, a wooden plug is driven into the hole.

bed for bridge members at dam

by RALPH MONSON, Field Editor

the tops of the girders.

One of the deck stiffener beams is located at each end of each of the bridge spans, and ten of the regular deck beams make up the remainder of the span. To pull the beams in each span into a rigid unit, ten prestressing cables, each consisting of 12 strands of 0.276-inch high-tensile wire, are strung through 2-inch formed holes in the stiffener beams and through the deck beams in the longitudinal direction of the bridge. As each bay is erected, these cables are stressed and locked in place.

After all the prestressed girders and beams have been erected, a sidewalk and parapet wall will be cast in place on each side of the deck. This will result in a roadway 26 feet wide. Sidewalks 4.33 feet wide on each side will have a 10-inch curb exposure. On the outer edges there will be a parapet 8 inches thick and 2.67 feet high, surmounted by a 3-inch steel handrail. Two inches of asphaltic wearing course applied over the concrete deck beams will complete the roadway surfacing.

Pave Spillway Slab First

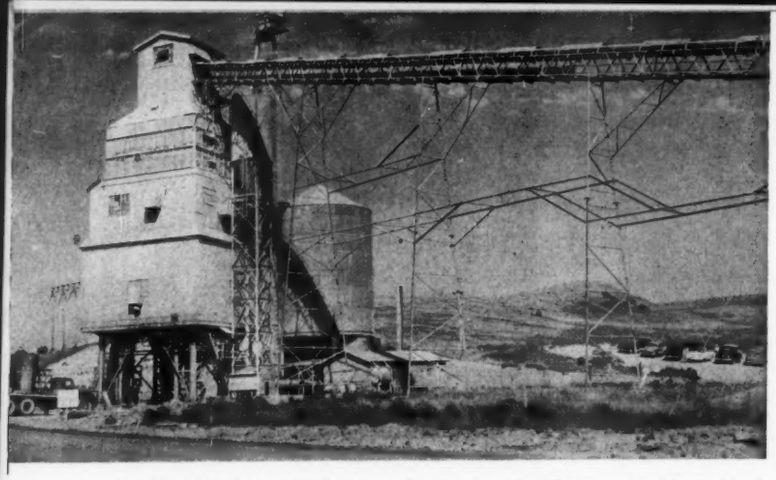
One of the early operations of the spillway construction was the placing of the 180,000 square yards of concrete paving in the slab of the spillway chute. This pavement is nominally 18 inches thick with edges thickened to 4 feet, and is reinforced with No. 9 hard-grade steel bars at 12-inch centers in both directions. The slab is anchored to the underlying shale by 24,176 anchor bars. These, extending 15 inches into the slab, are grouted into bell-bottom holes 6 inches in diameter and 13.5 feet deep. This slab—1,600 feet long and an average of 1,000 feet wide—slopes away from the crest structure at a grade of about ¾ of 1 per cent. It made an ideal casting bed for precasting and prestressing the bridge members.

To cast the 64 girders, the contractor built four sets of forms and provided 12 soffits to permit re-use of the side forms while the girders were curing on the soffits. Of treated ¾-inch Plyform backed with 3×8 studs and wales, the forms were easily assembled and quickly stripped, and they stood up well for the 16 re-uses required to cast all the girders. The soffits were made of 2-inch tongue-and-groove lumber resting on timbers on the spillway slab. Forms were equipped with railings around the top to protect workmen placing the concrete.

The girders, shaped in cross section like an I, are 6 feet high, 30 inches wide across the flanges, and 7 inches thick through the web. Stiffeners are provided at both ends and at the third points of the span. Overall length of the girders is 47.33 feet, and they weigh 35 tons each. In addition to normal temperature reinforcing, each of the girders contains seven prestressing cables encased in flexible metal tubing. Each cable consists of 12 strands of 250,000-psi steel wire 0.276 inches in diameter. Two of these cables are in the lower flange; the other five are in the web section.

Nine sets of side forms and 30 bases were built for casting the deck beams. Within three days after these beams were cast, the side forms were removed and reassembled on other bases. After stressing, the beams were

Two American R-25 gantry cranes with 155-foot booms lift a 35-ton precast and prestressed concrete girder into place in the north row of girders for the spillway bridge. The center line of the north row of girders is 116 feet from the center line of the gantry.



The 282,000 cubic yards of concrete for the stage 1 spillway contract is produced in this Noble plant, which receives aggregates into five bins from a 30-inch conveyor. Cement is handled from the Noble 500-barrel elevated silo on the tower. The Johnson 8,000-barrel cement silo at the right of the plant is for storage.
C&E Staff Photo

picked up from the bases by a Koehring 1005 crane and stockpiled three deep to await transportation to the erection area.

Deck beams, shaped like channels, are 4 feet wide and 28.5 feet long. The legs of the channels are 2 feet high. The web is 6 inches thick, and flanges taper from 7 inches at the junction with the web to 5 inches at the bottom. Each of these beams has four stiffening diaphragms. End stiffener beams have the same exterior dimensions as the regular deck beams, but they are solid rectangular sections. Five prestressing cables are incorporated into the deck sections, and each cable contains 12 wires, each 0.196 inches in diameter. Prestressing wires in the end stiffener sections are 0.276 inches in diameter, and these were encased in flexible metal tubing.

Pour Concrete at Night

With the help of a Lorain and an American truck crane, the day crews stripped and reassembled the girder and beam forms. When time permitted and equipment was available, the day crew placed some concrete in the beams. But most of the concrete in girders and beams was placed by the night shift. Concrete for the bridge members, like all other concrete in the spillway, was mixed in a big Noble plant and transported to the job in Gar-Bro buckets on International R-190 trucks.

Although the concrete plant was geared to the high-speed pouring of the spillway slab, it also worked satisfactorily for producing the mix for the bridge members. This plant had an elaborate conveyor system for stockpiling and recovering aggregates and an 8,000-barrel Johnson cement storage silo requiring a 41-foot-long cement screw.

Sand, produced from a pit across the river from the plant, was screened in the pit to remove everything larger than ⅜ inch. A fleet of Euclid bottom-dumps hauled from the pit to a plant, where the sand was separated and reclassified by water and screening to meet the specifications. Coarse aggregate in four sizes from 6 inches down was produced in a government pit located at Greene, N. Dak., and operated by J. L. Shiely Co., St. Paul, Minn. From here, it was shipped by rail to the dam.

Although coarse aggregates up to 6 inches in size were used in some of the mass concrete, the maximum size used in the bridge sections was ¾ inch. The mix for the girders contained eight sacks of cement per yard and was designed to give a compressive strength of 4,500 psi in 11 days. The mix for the beams had 8.5 sacks per yard and attained a strength of 4,500 psi in eight days.

Concrete was mixed in two T. L. Smith 112-S tilting mixers which easily handled 4-yard batches. When crews were paving the spillway slab, the mix was hauled in Gar-Bro 2-yard buckets with air-operated gates. Two of these buckets were carried on the bed of an International R-190 truck. In the mass pours in the spillway head structure, where the buckets could be handled by the American R-25 gantry cranes, 4-yard Gar-Bro buckets were used, each truck carrying one bucket. For the bridge members and other small pours, the concrete was transported in 1-yard Gar-Bro buckets with manually-operated gates. Three of these buckets were carried on each truck.

Since there was a great deal of difference in height between the 4-yard buckets and the 1-yard size, it was necessary to build up a timber platform on the bed of each truck. This brought the tops of the 1-yard buckets close enough to the discharge chute of the mixers to prevent spilling and segregation when the buckets were filled. These timber platforms were set on the trucks, or removed if necessary, by one of the cranes. Eight trucks hauled all the concrete which went into the spillway.

Stiff Mix Requires Vibration

In the precast bridge sections, a mix of 4-inch slump was used for the

New Trailmobile Dump Trailer...

tandem axle, 25 ton capacity. Rugged "workhorse" on toughest jobs! Hi-tensile steel body has light weight . . . tremendous strength. Tailgate opens top or bottom. 3-stage hoist mounted to push directly under load. Also built with single axle, 15 ton capacity! Power Fifth Wheel available when you require pump and tank on trailer.

Ease the squeeze on profits with cost-cutting

TRAILMOBILE PLATFORM TRAILERS with famous Trailmobile Tandem give years of low-cost hauling! Handle maximum loads of lumber, pipe, sheet metal, "I" beams. Main frame rails are full 15″ deep for extra load-carrying strength! "Cantilever" outriggers supported by cross-members every 18″ for still greater ruggedness! Also available as a two- or four-wheeler flat, without tandem!

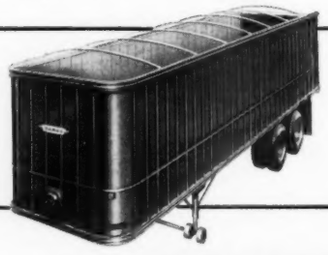
TRAILMOBILE ASPHALT TANKS feature advanced design, rugged, hi-tensile steel construction, big capacity. Depend on them for extra years of troublefree service and a higher price at resale time.

Illustrated —

TRAILMOBILE LOW BED TRAILER MODEL FR

hauls really back-breaking loads with ease! Electrically-welded throughout for extra strength and long life! Models available with trunnion axle assemblies, enclosed rocker beams, level or drop platforms. Capacities from 15 to 35 tons!

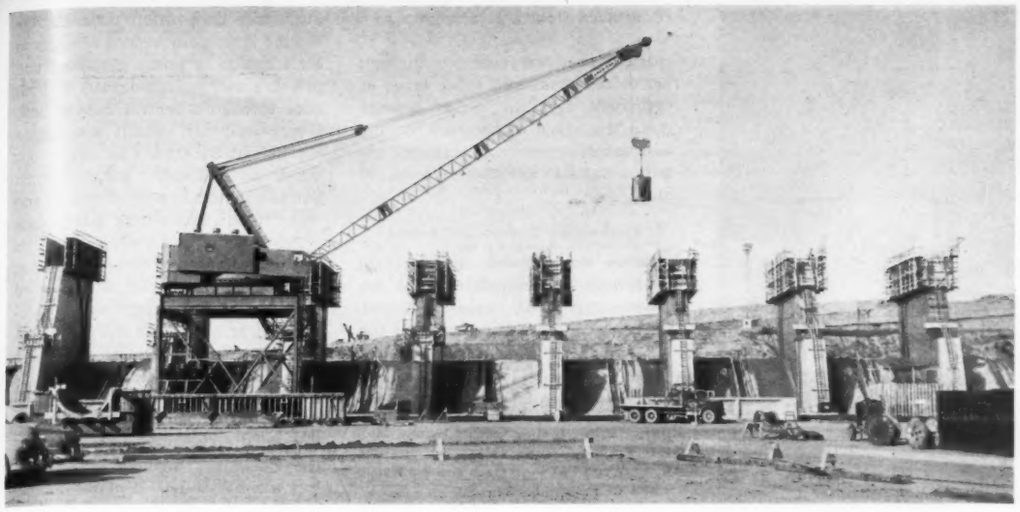
TRAILMOBILE HEAVY-DUTY LOW BED TRAILER MODEL FC. When you've got to move shovels, road rollers, machinery and other equipment up to 75 tons, you need a Model FC Trailmobile trailer! Built *rugged* with best quality steel and other materials, electrically welded throughout, keeps upkeep costs low! Capacities from 45 to 75 tons!



NEW, LIGHTWEIGHT OPEN TOP IP (INTEGRAL POST) VAN combines all-steel construction, strength and light weight! New IP (Integral Post) construction features integral posts on 12″ centers . . . only 7″ apart! This lets you haul bulky, concentrated loads with ease! Open top construction allows for crane-loading!

TRAILMOBILE BULK COMMODITIES TRAILER

handles any and all materials that will flow . . . asphalt, core sand, aggregate and other bulk commodities. Fibre-glass insulation provides high insulating efficiency, saves weight.



An American R-25 gantry crane with 155-foot boom lifts a Gar-Bro 4-yard air-operated bucket from an International R-190 truck to make a pour on one of the spillway crest structures.

C&E Staff Photo

girders and a mix of 2-inch slump for the beams. Since the sections of the members were relatively thin and contained some conventional reinforcing in addition to the prestressing cables, it was difficult to work the concrete around the steel and into the thin sections. The lower flange of the girders was particularly troublesome until the contractor devised an external vibrator which worked very well.

This rig consisted of a Viber air-operated vibrator mounted on a Blackhawk floor jack—the kind commonly used in garages. As the concrete was being placed, the jack and vibrator were rolled under the girder form between the timber supports. The vibrator was then raised up tight against the form by the jack, and air was turned on to start the vibrator. The rig could be quickly removed and placed in another position under the girder or rolled on its own casters to the next pour. Since air was piped throughout the casting area, it was not necessary to carry a portable compressor along.

Internal vibrators were also used on these pours. On some of the beam pours, it seemed that more men were operating Dart and Maginniss electric vibrators and Viber air-powered units than were involved in all other pouring operations.

Cured With Water

After the forms had been filled and the top surface finished, the concrete was cured for 14 days with water. The large volume of water required was obtained from the reservoir above the dam. About 7,000 feet upstream from the spillway location, a Fairbanks, Morse & Co. vertical turbine pump driven by a 75-hp electric motor pumped clear water from the reservoir for the curing operation. Water was sent through a line of 8-inch Spiral-Weld steel pipe to two 60,000-gallon storage tanks located high above the spillway on the east bank. The pump worked against a total head of about 350 feet.

An 8-inch pipe led from the storage tanks down to the spillway. Here, it branched into two 6-inch lines which served the entire area. The difference in elevation between the tanks and the spillway slab provided a gravity head of 140 feet and more than 60 pounds pressure. Water was

(Continued on next page)

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eliminate bags, barrels, storage and rehandling . . . saved one user $177 on each load (37½¢ per bag)! Speeds handling . . . unloads 118 barrels of dry cement in 15 minutes! The Trailmobile's lighter weight means lower operating costs, additional payloads.

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. . . Engineered to Outwork and Outlast them all . . . a finance plan to suit your needs!

It's great to be low bidder—if there's still room for a profit! So when you figure jobs, figure all the ways a Trailmobile trailer can help you cut costs . . . save man-hours . . . bring the job in on time!

Trailmobile Trailers cut down-time to the bone. They're built with brawn and muscle to take all the abuse you can give them! And they're always in demand in the used equipment market, too—contractors everywhere know them to be reliable and efficient no matter how rough the job turns out to be.

Whatever your hauling requirements, there's a rugged Trailmobile *right and ready* for you! See the yellow pages of your local phone directory for the location of your nearest Trailmobile branch office and able assistance in solving your hauling problems! Or, write us direct . . . use coupon below.

TRAILMOBILE USED TRAILERS
For Every Purpose!

Many contractors use Trailmobile Van Type Trailers as mobile or permanent field offices, drafting rooms, payroll and watchmen's shacks. Also for tool and equipment storage, transportation of heavy equipment from site-to-site, sleeping quarters, and many other uses! Low in cost, these used Trailmobile Trailers quickly pay for themselves in the time and money they save on shanty construction and erection at each new site!

Other top-value Trailmobile used trailers include:

TANKS . . . *for water, gasoline, oil, asphalt, bulk cement storage and transporting.*

FLATS . . . *to hold and haul air compressors, pipes, lumber, poles, bulky machinery, digging equipment.*

DUMPS . . . *for hauling up to 25 tons per load.*

All sizes . . . lengths . . . and types available!

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Friendly Trailmobile Branch Offices Throughout The U. S. To Assist You With Your Hauling Problems! Mail Coupon For Further Information!

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☐ Send us more information on _____type used trailers.

☐ Please have your representative call without obligation.

NAME _____

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ADDRESS _____

CITY _____ STATE _____

Small pours are made with Gar-Bro 1-yard buckets with hand-operated gates. The timber platform on the International truck raises the buckets so they can be filled from the discharge chute of the mixer.

C&E Staff Photo

(Continued from preceding page)

sprayed over the concrete through perforated pipes and other types of sprinklers, and the excess drained down the grade of the slab. Curing and wet sand-blasting operations required water in amounts up to 36,000 gph.

Prestressing Girders and Beams

When the concrete had attained a compressive strength of 4,500 psi, prestressing wires were tensioned. Stress was applied to the wires by the Freyssinet dual-piston method. Hydraulic jacks were wedged securely to each end of a group of wires, and pressure was applied equally to both ends through a central control unit. Compressed air, which was piped throughout the area, was used to operate a hydraulic piston which pumped the mixture of soluble oil and water from a supply tank to the jacks.

Readings of the pressure gage on the control unit gave an indication of the amount of stress being applied to the wires. This figure was double-checked by measuring the elongation of the wires. In the girders, wires were stretched 3 inches plus or minus 2/16 inch to obtain 190,000 psi tension. When the proper tension was obtained, the patented jack drove in the Freyssinet anchoring wedge to lock all the strands in place.

Although this was practically standard Freyssinet equipment, the contractor developed several equipment aids. One of these, a hoist for lifting the heavy jack into position at the ends of the girders, consisted of a pair of angles attached to a pipe pedestal near the midpoint of the angles. This device was set on the top of the girder with one end of the angles overhanging the end of the girder. The other end was then tied down to the top of the girder by clamping it to one of the projecting dowel bars. A light tackle (fence tightener) suspended from the overhanging end of the angles raised the jack from the ground and held it in place while it was being attached to the wires.

An unusual safety device was a plywood backstop which was always set up behind the jacks. This was intended to stop any flying wedges while stress was being applied to the wires. Flying wedges, which could have caused serious injury to someone quite a distance away, merely made deep scars in the backstop.

After the wires had been stressed, the remaining space in the cable sheaths was filled with cement grout under pressure. The grout mixture, composed of 1 part cement, ¾ part sand passing the No. 16 screen, ¼ part fly ash, 1 pound of Sika Plastiment per sack of cement, and water, was mixed in a special container by an electric mixer. The grout was then put through a window screen twice to eliminate lumps before it was poured into the grout bottle.

A useful gadget in the pressure-grouting operation consisted of a short piece of ¼-inch pipe threaded on both ends and attached to a valve. The pipe was threaded into the grouting hole in the wedge which locked the cables in place. The hose from the grout bottle was then attached to the pipe, and the grout was forced through the pipe into the space in the cable sheath. The hole in the other end of the sheath was left open. As grout started coming out of this hole, a workman closed it with a wooden plug. The valve at the other end of the pipe was then closed so that the grout in the cable sheath was retained under about 50-psi pressure. In about an hour, when the grout had attained its initial set, the pipe and valve were removed, washed clean, and re-used.

Gantry Cranes Erect Girders

Hairpin-shaped No. 11 reinforcing rods for later use as lifting hooks were installed in each of the girders

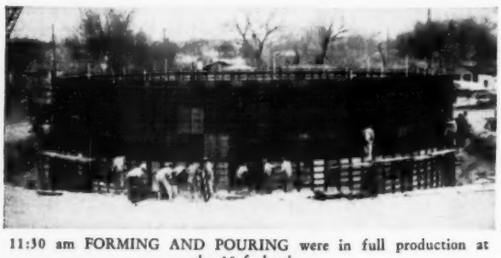
HIGH SPEED CONCRETE FORMING

Form and Pour 75 ft. diameter tank 26 ft. high in 8 hours!

9:30 am POURING started at 8:00 am. Here is 6 ft of concrete in place.

How a contractor formed and poured a circular tank 75 ft. in diameter with walls 26 ft. high and 14 inches thick in 8 hours, with maximum economy makes the concrete forming speed story of the year.

The tank was formed and poured by the contractor, C. H. Leavell & Co., El Paso, Texas, in record time, and a tough



11:30 am FORMING AND POURING were in full production at the 10-ft level.

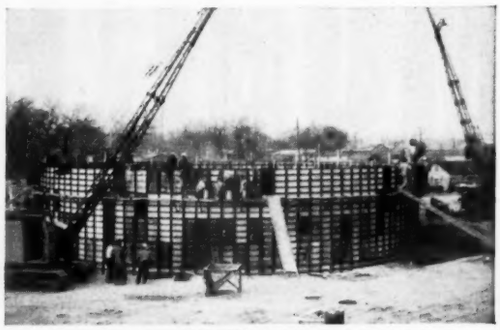
forming specification limiting maximum free drop of concrete to 4 ft. was rigidly adhered to.

UNI-FORM Concrete Forms — the prefabricated, ready to use form panels — were used on the job. Because UNI-FORMS

4:00 pm POURING at 22-ft level. Scaffold setters on final placement.

erect into a tight, rigid, automatically accurate form requiring alignment and bracing on 1 side only, the contractor conceived the idea of simultaneously forming and pouring the wall. Universal Form Clamp Co. engineers on the job agreed that the plan was feasible.

Rigidity of the steel-framed, plywood faced UNI-FORMS permitted fast, non-stop erection of the entire inside form. This permitted setting of reinforcing steel, outside forming, and concrete placement to proceed with maximum efficiency, speed and safety. The outside of the tank was formed using 5 lifts of 4 ft. and 2 lifts of 3 ft. UNI-FORM Panels. In this way, the concrete never dropped more than the specified 4 ft. below the height of the outside form.



4:45 pm UNI-FORMS now completed.

As successive pours were completed, the outside form was closed by setting the UNI-FORM Panels in place and locking them to the projecting UNI-FORM Ties. UNI-FORM Circular Wall Fillers, which member with UNI-FORM Panels, permitted forming the curve of the wall to specifications. Automatically accurate wall widths were insured, as the UNI-FORM Ties spread and locked the face of the Panels exactly 14" apart. UNI-FORM Scaffold Brackets, which fasten directly to the steel UNI-FORM frame, provided fast, low cost scaffolding.

5:15 pm Final concrete poured.

The result? Under the capable direction of job superintendent Paul Nigh and project manager N. J. Riebe — fast, low cost forming and pouring — an accurate, smooth faced wall with true curvature.

UNI-FORM Panels are versatile, high speed forming tools. They're used by the country's most successful contractors to form every conceivable type of construction. They are rented or sold . . . or rented with purchase option. Universal Distributors and Branches are located from Coast-to-coast. Write for UNI-FORM Catalog and complete details on UNI-FORMING — the *modern* way to form concrete.

UNIVERSAL FORM CLAMP CO.
1238 North Kostner Avenue • Chicago 51, Illinois

and beams during casting. The two American R-25 gantry cranes with their 155-foot booms raised the 35-ton loads by these lifting hooks and swung them into place on the piers. The difference in elevation from the slab where the girders were cast to the seats on which they were set was 66 feet. The distance from the center line of the north girders to the center line of the gantrys was 116 feet. This high lift and long reach required extremely careful operation and coordination of the big cranes. The deck beams, which weighed about nine tons each, were set by one of the cranes.

After the girders had been set and before the deck was placed, the 28 tainter gates were positioned. Each gate was 40 feet wide, 32 feet high, and weighed 47 tons. They were fabricated by Omaha Steel Works, Omaha, Nebr., and shipped in sections to the site, where they were painted before being hoisted into place.

Stage I of the Garrison spillway construction was started in June, 1952, and is scheduled for completion this September. Not long after that, travelers on North Dakota State Route 7 will start driving across the crest of the gigantic dam. They will probably be impressed by the huge lake now forming behind the structure, or the great mound of earth which is the dam itself, or by the structure's power-producing facilities. Few will realize they have crossed the spillway on one of the country's largest precast-prestressed concrete bridges.

Personnel

Supervising the entire spillway project for Garrison Spillway Constructors was project manager J. M. Kellogg. Among his many assistants were project engineer W. A. Anderson, general superintendent Ted Torgerson, and field superintendent George Torgerson. Supervising the forming and stressing of the bridge members was E. D. Ledwell.

GSC conducted an intensive safety campaign under the direction of safety engineer Albert Nollet. Proof of the program's effectiveness was the contractor's winning of the first award in the AGC safety contest, heavy division, class A, for the past two years. This division included jobs with more than 500,000 man-hours during the year.

All construction at Garrison Dam is under the supervision of the Garrison District of the U. S. Army Corps of Engineers, of which Col. Henry L. Hille, Jr., is district engineer. Chief of the construction division is H. G. Hutchins. Resident engineer for the spillway stage I contract is Emil Blomme, who is assisted by Wayne W. Wolfe. THE END

A CORAL ROCK formation which lies under the city of Miami, Fla., often eliminates the need for conventional pipe in sewers constructed in the area. On this storm-sewer project along State Highway 9 in Miami, the walls of a 2 × 8-foot trench and an 8-inch slab of concrete poured over the top complete the tunnel. The Wright Construction Co., Fort Lauderdale, Fla., uses a Barber-Greene No. 44 trencher powered by a General Motors 3-71 diesel engine to cut through the formation. For further information write to Detroit Diesel Engine Division, General Motors Corp., 13400 W. Outer Drive, Detroit 28, Mich., or use the Request Card that is bound in at page 18. Circle No. 826.

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★ Pumps 15 gallons per minute
★ Primes itself
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★ Strains Fuel through Replaceable Strainer

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CUNNINGHAM - - KANSAS

Build Profitime . . . Cut Downtime

with Firestone NYLON Off-The-Highway Tires

THAT's right! You increase yardage and profits and keep your downtime at a minimum with rugged Firestone Nylon Off-The-Highway Tires.

Whether it's earth moving, rock work or strip mining, Firestone can supply a rugged nylon tire specifically engineered for the job.

It costs you less to run on Firestone Nylon Tires because the treads give maximum traction and they are extra tough to resist cutting. The sidewalls are double thick to give added protection against cuts and snags. The new Firestone Safety-Tensioned Gum-Dipped* nylon cord body has four extra tread plies to insure longer tire life and more retreads. The Firestone Safety-Tensioned Gum-Dipped nylon body gives the greatest protection against impact breaks . . . flex breaks . . . heat failures . . . and water damage.

Let your Firestone Dealer or Store show you how Firestone Nylon Off-The-Highway Tires will cut your downtime and increase your profits. *T.M. Reg. U.S. Pat. Off.

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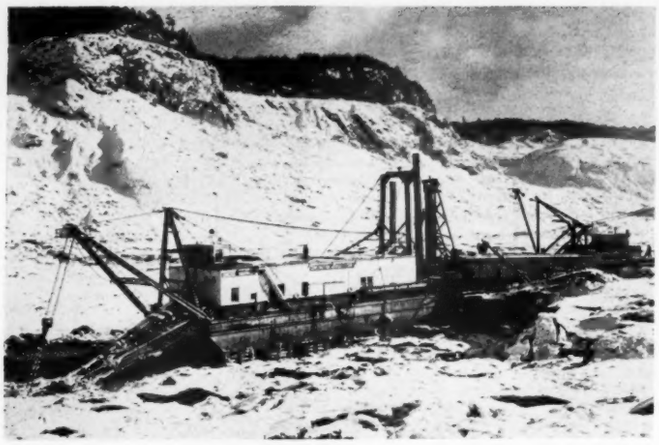
Two-mile portage operation takes dredges up icy grade

This past winter may not be memorable for any weather records, but for Construction Aggregates Corp., Chicago, Ill., it will stand out as being the season in which the company completed one of its tougher assignments.

The job involved moving two 900-ton dredges, the Steep Rock and the Marmion, two miles overland to a new ore deposit after both had completed stripping 55 million tons of overburden from a deposit at Steep Rock Lake, Ontario. The long portage operation for the dredges and auxiliary equipment was carried out in 20-below temperatures. For 1,500 feet, the route ran up an icy 8 to 10 per cent grade.

To start the operation, the company attached three sets of heavy crawler-crane undercarriages to the bottom of each dredge. To do this, it was necessary for one of the dredges to lower the water in Steep Rock Lake so that bearing cribs weighted with iron ore could be set on the dry shelf area. The lake was then reflooded until the dredges floated over the crib blocks, and the water was lowered again to permit the dredges to settle on the blocks. This procedure was reversed when the dredges reached their new location.

Hoisting machinery aboard each dredge, augmented by pushing and pulling tractors, supplied power for the move. The dredge hoist machinery operated through a system of blocks attached to anchor chains and secured to deadmen embedded in rock along the steep grade. Pintle bearings, which transferred the weight of each dredge to the tractors, enabled the dredges to follow variations in the road. Tongues fastened to the crawler frames and operated by steamboat ratchets secured to the hulls of each dredge simplified turning operations along the route.



◄ The dredges Steep Rock and Marmion are mounted on blocks at Steep Rock Lake, Ontario, before being set on heavy crawler crane undercarriages for the move overland to a new work site.

Curb and Gutter Forms

■ Steel forms made by Binghamton Metal Forms, Inc., 15-19 Griswold St., Binghamton, N. Y., are shown in a new folder from the company. The literature includes photographs, specifications, and prices for O-K straight forms for sidewalks, gutters, and curbs, and Arrow lightweight forms for sidewalks only.

The folder also illustrates O-K flexible forms with radius locking bands. These serve the same purpose as fixed radius forms, but are equipped so that they can be quickly adjusted to different curves.

Also illustrated are the Super curb and gutter forms for straight and battered curbs. These are specified when the forms are to be left in place after the division plates have been removed.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 904.

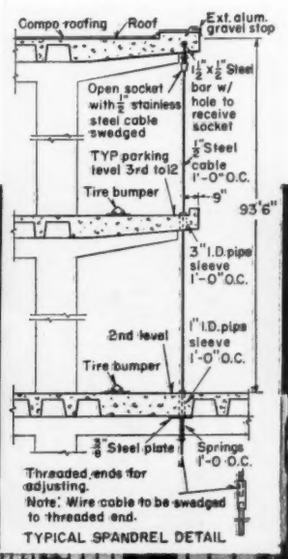
Bulletin Describes Line Of Tandem Rollers

■ A new bulletin on its tandem rollers has been released by Huber-Warco Co., Marion, Ohio. The literature features color photos of the tandem rollers in action and describes in detail the company's 5 to 8, 8 to 10, and 8 to 12, and 10 to 14-ton models.

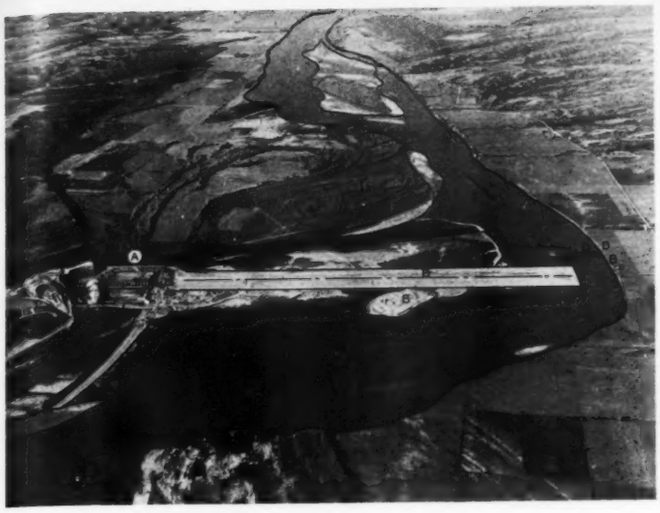
With cross-section drawings, diagrams, and photos, the bulletin points out the features of the frame, gear train, guide roll assembly, fluid coupling, clutches, dual controls, and two independent braking systems. The roller's close curb clearance, accessibility for servicing, and ventilation are also described.

To obtain bulletin HWT-501 write to the company, or use the Request Card that is bound in at page 18. Circle No. 862.

Tiger Brand is the


Compo roofing
Roof
Ext. alum. gravel stop
Open socket with ½" stainless steel cable swedged
½" x 1" Steel bar w/ hole to receive socket
TYP. parking level 3rd to 12
½" Steel cable 1'-0" O.C.
Tire bumper
9"
93'6"
3" I.D. pipe sleeve 1'-0" O.C.
2nd level
1" I.D. pipe sleeve 1'-0" O.C.
Tire bumper
⅜" Steel plate
Springs 1'-0 O.C.
Threaded ends for adjusting.
Note: Wire cable to be swedged to threaded end.
TYPICAL SPANDREL DETAIL

Peekaboo Wall. In Chicago's newest parking garage, the architects wanted a wall material that was both beautiful and functional, one that would stay that way for years without maintenance. They took off into the blue and designed themselves a unique *wall of strand*—Tiger Brand *Stainless Steel* Strand. This stainless steel strand makes a striking appearance, resists torsion, and was easy to install. American Quality Springs provide the tension (1,000 pounds) to keep the strand taut and straight.



Superimposed on this aerial view of Gavins Point Dam on the Missouri River is a diagram showing a sequence of closure, which will be accomplished in five days from July 1. Four plugs (A) will be removed from the dam as material from stockpiles (B) is placed by draglines (D) to complete the 150-foot closure dike (C).

Diversion of Missouri into Gavins Point powerhouse is scheduled

On July 1, 1955, the U. S. Army Corps of Engineers will start a five-day operation to divert the flow of the Missouri River through the Gavins Point Dam on the Nebraska-South Dakota border, near Yankton, S. Dak.

The operation will be accomplished in two stages. In the first three-day stage, two draglines and a fleet of dump trucks will build a 450-foot chalk dike extending riverward from the upstream side of the embankment. The closure dike will be 600 feet long and about seven feet above water surface.

During the last two-day phase, the two draglines will work from the 450-foot portion and the South Dakota shore to place the remaining 150-foot section of the closure dike. One of the draglines, now being tested on the job, has a 150-foot boom and a 13-cubic-yard bucket.

During the first stage, the Army Engineers at Fort Randall, 65 miles upstream, will reduce the flow of the Missouri River from 50,000 second-feet to 20,000 second-feet. The flow will again be reduced from 20,000 to 7,000 second-feet during the final stage when the gap in the closure section is filled.

At the completion of the five-day operation, the Army Engineers at Fort Randall will reverse the flow process, restoring the normal flow of the Missouri. When completed, the closure dike will contain more than 90,000 cubic yards of earth.

Closing the Gavins Point Dam is part of an $18,007,934 contract held by the combine of Western, Massman, & Jones Construction Cos. The Gavins Point project is scheduled for completion in November, 1955. THE END

Catalog on Bulldozer And Angling Blade

■ International hydraulic Bullgrader and bulldozer blades matched to International T-6, TD-6, T-9, TD-14A, and TD-18A crawlers are described in a new catalog. The bulldozer blade assembly is solid welded without pin connections, providing a rigid and level blade. The Bullgrader blade, connected by pins to the main frame, may be angled horizontally or tilted vertically.

The literature emphasizes the blades' balanced design, achieved by mounting blade equipment in front of the tractor point and hydraulic cylinders and other heavy parts behind this point. The main frame of the Bullgrader or bulldozer is attached to the crawler tractor at the track oscillation point to carry thrusts directly to pivots on the rear support brackets.

To obtain this literature write to International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill., or use the Request Card at page 18. Circle No. 830.

United Engineering Head

Walter J. Barrett, electrical coordination engineer for the New Jersey Bell Telephone Co., Newark, N. J., has been installed as president of the United Engineering Trustees, Inc., New York, N. Y.

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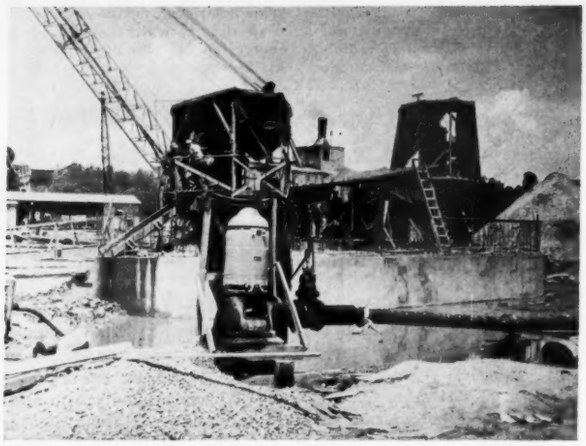
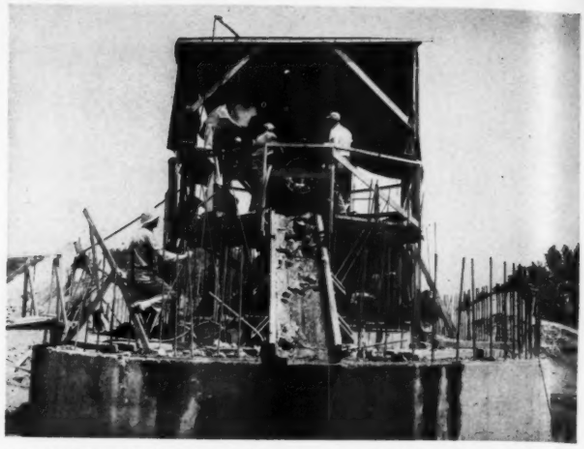
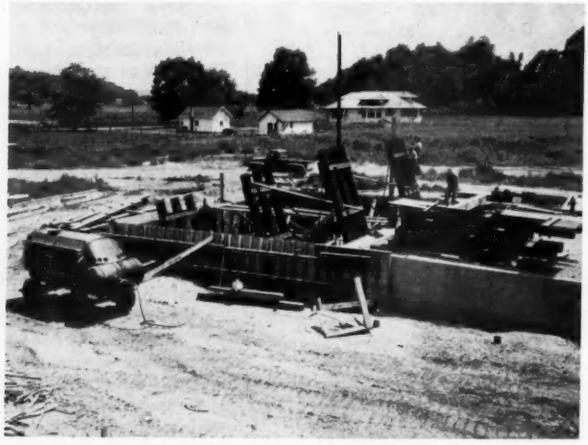


A Layne pump lowers ground-water level around the caisson enough so that the caisson can be sunk to its 149-foot depth with an air pressure of 48 psi.

C&E Staff Photos



Rock is hoisted in buckets to the caisson's air lock by an Ingersoll-Rand air tugger. After pressure is released, the bucket is dumped by hand. Sand is brought up from the caisson in two 4-inch blow pipes.



An Ingersoll-Rand 315-cfm compressor operates air tools used in assembling anchor bolt racks set in the east anchor pier. Approximately 4,300 cubic yards of concrete is used in this anchor.

Pumps lower ground water for c

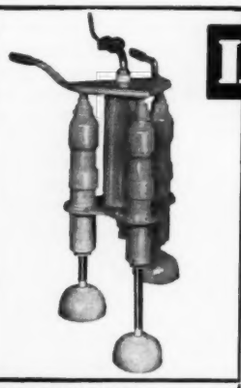
Safe working air pressure is kept in 149-foot-deep caisson sunk for pipeline suspension span across the Mississippi

Founded on a pier claimed to be the deepest ever sunk as a pressurized caisson, the first pipeline bridge across the Mississippi River also boasts the longest main span for pipeline suspension bridges. The distance from tower to tower is 2,150 feet.

This $3,500,000 overhead crossing between Wittenberg, Mo., and Grand Tower, Ill., will support two 30-inch lines of the Texas Illinois Natural Gas Pipeline Co., Inc., Chicago, Ill., which carry natural gas from fields in southwestern Texas to the Chicago area. Designed by Matthews & Kenan, San Antonio, Texas, the span replaces a subaqueous line installed in 1950 when the pipeline was built. The pipeline bridge is designed to assure an uninterrupted flow of gas to users in Chicago's metropolitan area.

Massman Construction Co., Kansas City, Mo., contractor for the substructure, started work by sinking the west bank tower caisson to bedrock through 149 feet of fine-grained river-bottom sand. The first job it tackled was lowering the water table in the area around the pier artificially, so that work could be done at the extreme depth under a pressure of only 48 psi. Work at this depth would ordinarily require an air pressure of 60 psi—10 psi more than the law allows.

Four deep wells surrounding the caisson were pumped continuously during the operation to keep the water level down. Each of the four



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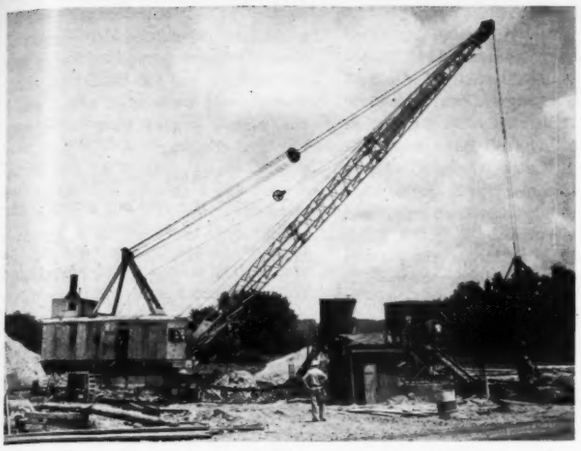

Sand and rock is excavated around the caisson by an American revolver crane with 1½-yard Haiss clamshell. Right-hand and left-hand-lay cables hold the bucket straight, eliminating the need for a tagline.

ater for deep bridge caisson

gravel-packed wells, which were 150 feet deep, consisted of a 30-inch hole in which an 18-inch casing was surrounded with gravel. The wells were equipped with Layne vertical turbine pumps powered by 100-hp electric motors. These turbines, with a 3,000-gpm capacity, were set 100 feet down inside the casings, and their suction lines extended to the bottom of the wells. Once the water level had been lowered sufficiently, they were throttled down to pump about 600 gpm.

As the sinking progressed, the disturbance to the ground surrounding the caisson pulled the wall casings crooked, and it became impossible to operate the pumps. Air lifts—8-inch pipes with air jets blowing up through them—were installed in three of the wells to permit the pumps to operate. The fourth well was located in a rock formation and did not produce enough water to require pumping. The air lifts were supplied with air by the same battery of compressors which supplied air to the caissons. However, they were not as effective as the turbine pumps. Caisson air pressure had to be raised to keep the water level down, but the pressure was low enough to permit work to be done within the legal and physical limit.

The caisson, 28 feet wide and 62 feet long, is rounded at both ends. Three dredge wells, each 14 feet in diameter, accommodated two material

(*Continued on next page*)

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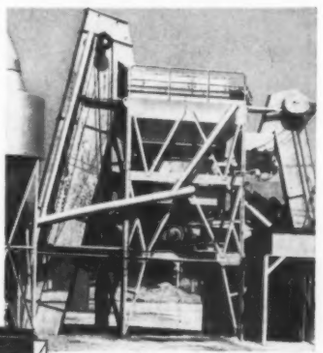

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A form panel for the first pour above ground level on the east tower footing is set in place by a Bucyrus-Erie 38-B. Forms for the dumbbell-shaped pier were fabricated in a nearby yard.

(Continued from preceding page)

lifts and two personnel shafts. Three-foot shafts inside each of the end wells were equipped with side-door air locks. Materials were hoisted in buckets by Ingersoll-Rand and Chicago Pneumatic air tuggers. The center well contained two 3-foot personnel shafts for workmen entering and leaving the caisson.

The bottom section of the caisson —including the cutting edge—was 12.5 feet high. Succeeding sections were built up 10 feet at a time until the caisson reached its full height of 142.5 feet.

Serving the caisson was an American revolver 40-ton steam crane mounted on rails and located so that it could reach the entire area around the caisson. Using a right-hand-lay lifting cable and a left-hand-lay closing cable, this crane handled a Haiss 1½-cubic-yard clamshell bucket without a tagline. There was no tendency for the bucket to twist, and it could be used in areas where the tagline would have been very much in the way.

Sinking Procedure

To start the sinking process, the first section of the caisson was cast in place on its cutting edge on the ground. The crane then clammed sand out of the shell, and the caisson began to settle. When the top of the first section reached ground level, the forms were set and a second section 10 feet high was added. The big steel outside form for the caisson was made in just two pieces which bolted together at the ends. These forms were set and stripped by the crane. After the forms had been removed, the crane continued to excavate within the caisson. This process was continued until the cutting edge reached a depth of 125 feet and it became necessary to plug up the dredge wells and continue work under air pressure. The plugs, of concrete 10 feet deep, were placed at the level of the fifth caisson pour.

At the start of the air work, the compressor plant consisted of two Joy 630's and two Worthington 500's, manifolded and discharging through an after-cooler into a large main receiver. This in turn discharged into the caisson supply lines through Fisher Wizard valves, which reduced and controlled the pressure. When the cutting edge of the caisson landed on the uneven rock, compressor power was gradually increased to supply the large amount of extra air needed to permit work in the rock below the cutting edge.

At the time the caisson was sealed and air operations ceased, the plant consisted of five Joy 630's, a Gardner-Denver 600, and a Schramm 600. Air tools used in the caisson were driven by a Joy WG-9 compressor which drew air from the main receiver and boosted it to 100 psi above caisson pressure. Thus the tools ran at full efficiency despite the back pressure. This supply was also controlled by a Fisher valve.

Each 10-foot lift of the caisson required about 400 cubic yards of concrete, and the pour was usually made in 6 hours. Aggregates were batched from a Blaw-Knox hopper charged by a Northwest 6 crane with Owen 1-yard clamshell bucket. A conveyor carried sack cement from a storage building to an elevated platform. Batch trucks drove under the platform, and the cement was added by hand. Mixing water was pumped from the wells beside the caisson. Some water was raised by a Deming 5×5-inch piston pump to a 6,000-gallon elevated tank and carried by pipes and hoses to the mixers.

Two pavers mixed concrete for the pours. One was a Koehring 16-E Twinbatch mounted on rubber tires, the other was a MultiFoote 34-E single-drum machine. Two cranes handled four Blaw-Knox bottom-dump concrete buckets from the mixers to the forms. Two buckets were of 2-yard capacity and the other two were 1½-yard. Three Mall electric vibrators assisted in the compaction of the mix. On these pours the American revolver was augmented either by a Bucyrus-Erie 38-B or a Manitowoc crane. Typical 0.54-cubic-yard

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batches contained 1,164 pounds of rock, 900 pounds of sand, and three bags of Type II cement. No admixtures were used.

When the caisson was first plugged and air pressure applied, the cutting edge was within about eight feet of the closest rock. Since the strata was very irregular, one side of the caisson was more than 12 feet into rock before the entire caisson entered the material. This required the excavation of a considerable volume of rock. Inside the caisson, blast holes were drilled with Gardner-Denver jackhammers using air supplied by the Joy high-pressure compressor. Holes were loaded with American 3B semigel dynamite and detonated electrically.

Rock was loaded into buckets which were hoisted to the surface by the air-powered winches, and dumped outside the caisson. Sand was brought to the surface with two 4-inch blowpipes which discharged just outside the caisson. The American revolver picked up these materials with a clamshell bucket and cast them on waste piles out of the way.

As the depth increased, working pressure increased until, for a short period, sandhogs put in only two half-hour shifts per day. The pressure was later decreased, and the sinking finished with men working two 45-minute shifts per day.

Caisson sinking was halted at a 143.6-foot depth after a small fracture occurred in the chamber wall. The fracture was caused by the caisson being pinched in the irregular rock formation, along with the extreme high pressure. Taking the caisson down the remaining 5.7 feet was thought to be too hazardous. The pier was completed by the underpinning method of excavating, mud packing, and pouring a 1-inch-thick chain wall of concrete down to rock under the caisson's cutting edge. A depth of 14 feet was underpinned in some cases to reach solid rock. In these areas, sandhogs worked 157.6 feet below ground line and 14 feet below the original working chamber. The formation was then cleaned out to solid rock, and a 700-cubic-yard 4,500-pound concrete seal was poured.

The unevenness of the rock prevented the cutting edge from being seated all around. Here, the caisson was underpinned at spots where the cutting edge was not bearing, and the rock was cleaned off. The deepest point was about 157 feet below natural ground and 135 feet below river level. As far as is known, this is about 12 feet deeper than sandhogs have ever worked under river level before. With rock cleaned, a concrete seal was was placed over the entire area to a depth of 25 feet 9 inches above the cutting edge. The remainder of the shafts were left open to the top of the caisson. Over the entire top, a slab of concrete 4 feet thick provided a base for the balance of the pier. Two subsequent 4-foot lifts with battered sides formed the pedestal for the main pier shaft. This shaft, with rounded sides, is 12 feet wide, 50 feet long, and 14 feet high. A steel tower 246 feet high will rise above this pier.

Other Piers

Foundations for the east tower pier on the Illinois bank reach down about 34 feet to solid rock. Here, steel sheet piling was driven to rock with a McKiernan-Terry No. 700 steam hammer handled by a Bucyrus-Erie 38-B crane. Then the crane excavated to rock inside the sheathing with a 1-yard Blaw-Knox clamshell bucket. A solid concrete shaft was poured to ground level, and above that a dumbell-shaped pier brought the substructure to finished grade.

Anchor piers at both ends are located 840 feet back from the tower foundations. On the Missouri bank, the anchor is founded on 94 H-piles driven down to solid rock. These 14-inch 73-pound piles were driven with a McKiernan-Terry 9-B-4 steam hammer. The anchor is a block of concrete on the piles containing approximately 2,600 cubic yards. Of this amount, 1,700 cubic yards was placed in a single continuous operation. The same equipment used on the caisson pours was used here also, with the exception of the cranes. These pours, out of the range of the American revolver, were made with a Bucyrus-Erie 38-B and a Manitowoc 2000.

Like the east tower foundation, the east anchor rests on solid rock. After sheet piling was set, excavation was carried down about 43 feet through sand and gravel. When the rock was exposed, there was a natural key in just the right place. For this anchor about 3,500 cubic yards of concrete was placed underground and about 800 yards in the structure above the surface. The same mixing and placing equipment was used for concrete work on both sides of the river. These machines were loaded on barges and towed across the river by the little towboat, Blackie, powered by a 45-hp Waukesha engine. But since operators could not work on both sides of the river, new operators were assigned to equipment as it was moved across. Separate batching plants, both quite similar, were maintained on each side of the river.

Superstructure

American Bridge Division started erecting steel for the superstructure early in July and expects to have the work completed early this year. Superstructure work on the long and slender span features an unusual method of wind bracing. Special wind cables, consisting of two 2⅜-inch strands, are secured to the anchors at both ends of the bridge and pass over a special truss on each side of each main tower. These trusses are 51 feet above the concrete of the pier. They reach out 165 feet each way from the tower, spreading the wind cables a total of 330 feet. Near the center of the main span, the wind

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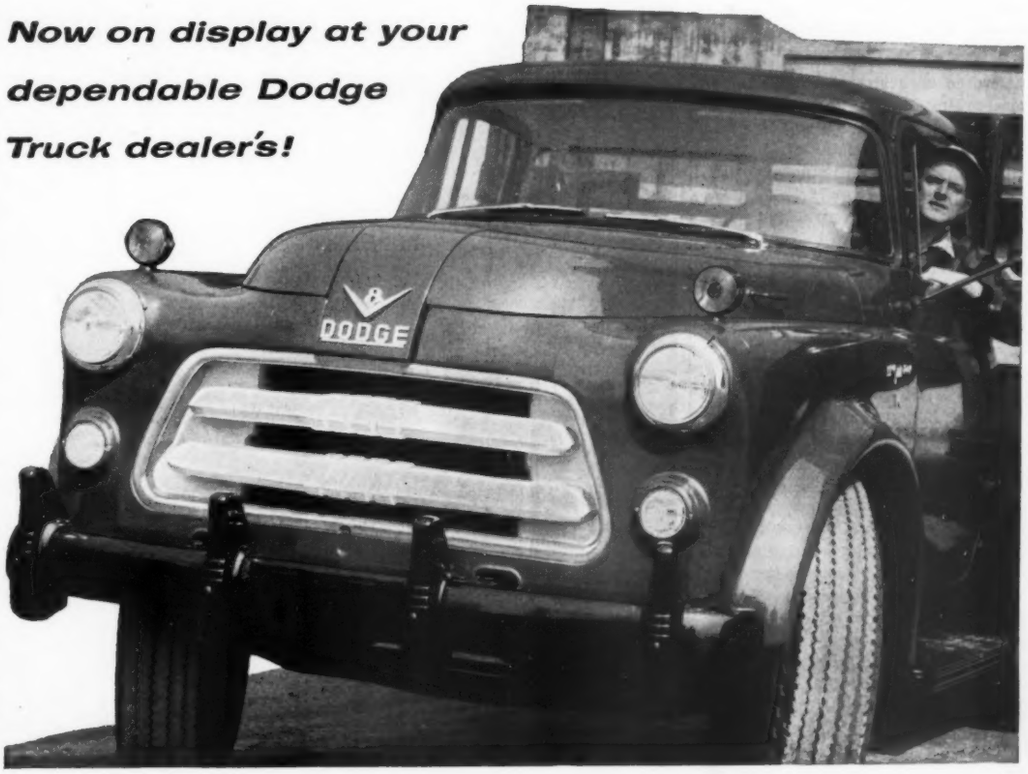


cables come back to meet the main cables. Both diagonal and horizontal ties connect the wind cables with the main cables and with the pipes.

Each of the two main cables consists of twelve 2-inch strands. From the anchors, they pass over rocker bents 75 feet away, span 840 feet to the top of the main tower, and run 2,150 feet across the river. Minimum clearance above extreme high water in the river is 75 feet. Two 30-inch pipes hang by cable supports from the main cables. Only one of these will be put into use immediately. Both will eventually be filled with gas at the same pressure to equalize their weight and minimize inequalities in expansion and contraction.

Personnel

General superintendent for Massman Construction Co. on the project was T. D. Napier. On the Missouri side most of the details were handled by assistant superintendent Fred Potter. Ralph Hall supervised the work on the Illinois side for the contractor. Resident engineer for the Texas Illinois Natural Gas Pipeline Co. was E. E. Moncla. General superintendent for American Bridge was Fred Robertson. THE END

Steel Scaffolding Has Improved Brace Lock

■ The sectional tubular-steel scaffolding made by the Marvel Equipment Co., Oshkosh, Wis., is now manufactured with an improved locking mechanism. Braces are placed on a solid bar stud on the Vise-Lock instead of on a threaded stud. This eliminates thread stripping and loss of wing nuts.

The new brace lock on Marvel steel scaffolding is made so that braces rest on a solid bar stud rather than a threaded stud.

A free-swinging clamp uses a wing nut to lock one or two braces, tightening on a separate threaded stud.

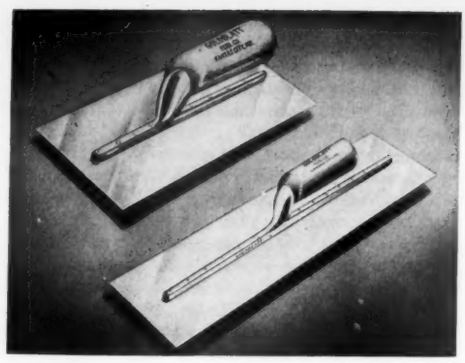
For further information write to the company, or use the Request Card at page 18. Circle No. 953.

Concrete Vibrator Line

■ A new bulletin on the Vibro-Plus line of gasoline, electric, and pneumatic concrete vibrators is available on request.

The literature emphasizes that all Vibro-Plus concrete vibrators have the Rollgear vibrator head that obtains up to 12,000 vibrations per minute with a flexible shaft speed of 3,600 rpm. This feature is reported to give an exceptionally long service life.

To obtain Bulletin No. 551 write to Vibro-Plus Products, Inc., 54-11 Queens Blvd., Woodside, Long Island, N. Y., or use the Request Card at page 18. Circle No. 913.



These trowels, made from a new stainless alloy, are reported to resist wear and rust better than conventional steel trowels.

Stainless-Steel Trowels Resist Rust and Abrasion

■ A line of trowels made from a new flexible stainless steel alloy has been announced by Goldblatt Tool Co., Dept. Y30, 1960 Walnut St., Kansas City 8, Mo. The special-analysis stainless spring steel makes the trowels more resistant to rust, abrasion, etc.

The trowels are available in two sizes: a 14×4-inch cement trowel with straight handle, and a 10½×4½-inch plastering trowel with either straight or camel-back handle.

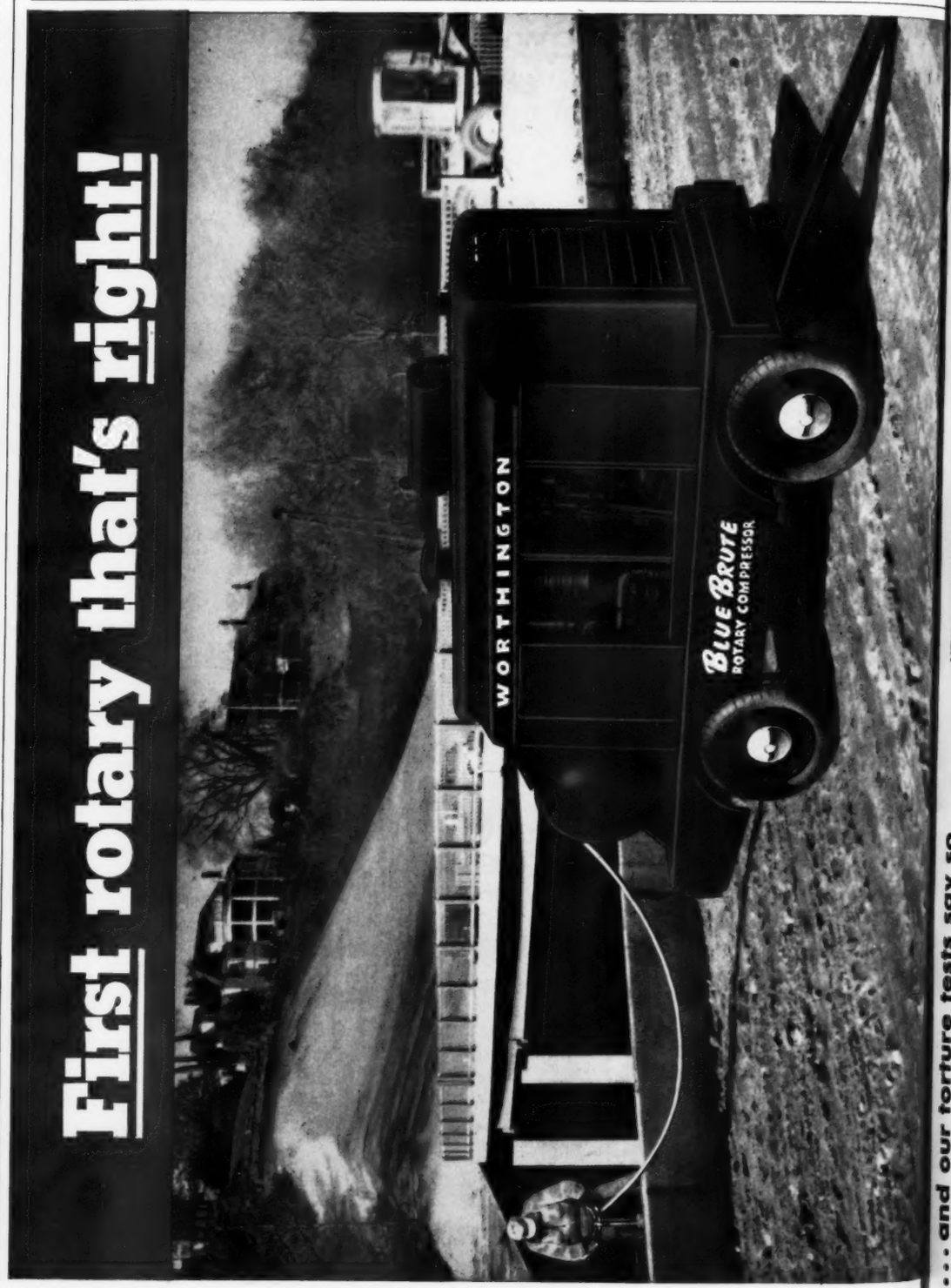
For further information write to the company, or use the Request Card at page 18. Circle No. 875.

Armco Promotes Two

J. E. Kunkler has been made sales manager of the southwestern division of Armco Drainage & Metal Products, Inc., a subsidiary of Armco Steel Corp., Middletown, Ohio.

Succeeding Mr. Kunkler as manager of southern California and Arizona sales for the Calco Division of Armco Drainage is J. B. Evans.

Mr. Kunkler joined Armco in 1941. He will make his headquarters in Houston, Texas, while Mr. Evans will be located in Los Angeles.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Every feature in the new Worthington Blue Brute Rotary has been proved and re-proved by many months of the most grueling

Details on Portable Dryer For Sand, Stone, and Gravel

■ The Tarco Flash-Flame aggregate and material dryer is illustrated in literature from Tarrant Mfg. Co., Saratoga Springs, N. Y. The wheel-mounted machine provides hot or dry sand, stone, or gravel.

Three models of the Tarco Flash-Flame dryer described differ only in the method by which fuel is carried and dispensed. The Model AD-7 is equipped with a 5-gallon tank and a manually operated fuel pump. This unit is best suited for short drying runs.

Model AD-7-P is equipped with an automatic engine-driven fuel pump and a 14-gallon built-in tank. Model AD-7-PX has the automatic fuel pump but does not have fuel storage facilities. Fitting and necessary tubing are supplied with this model so that fuel may be pumped from any suitable container.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 804.

Blaw-Knox Promotes

A. H. Jackson, the former sales manager of the Tower Department, Equipment Division of Blaw-Knox Co., Pittsburgh, Pa., has been promoted to general manager of the division's new engineering and development department. Mr. Jackson, with the company for 28 years, will coordinate engineering, research, and development of the six major product lines manufactured by the division. These include towers, steel plants, road-construction equipment, clamshell buckets, and forms.

The Federal Sod-Master power sod cutter.

Power Sod Cutter

■ A power sod cutter rated to cut from 70 to 125 feet of sod per minute is made by Federal Sod-Master, 3456 N. Washington Ave., Minneapolis 12, Minn. The knobby-wheel-drive machine is available in models with 12 to 24-inch cutting widths. Depth of cut varies from ½ to 2½ inches.

The Federal Sod-Master has been designed for one-man operation with all controls convenient to the operator. A belt clutch, gear shift, cutting-depth control, and adjustable stop for depth of cut are all within reach of the operator from his position at the handlebars.

Specifications list a 5.2-hp Briggs & Stratton engine or an optional 6.6-hp engine. The drive is a combination V-belt and gear-and-roller-chain drive. The traction wheels have renewable molded-rubber knobbed tires.

Side-cutting knives and a cross-cut coulter are available for the machine.

For further information write to the company, or use the Request Card at page 18. Circle No. 952.

Small Electric Generator

■ The first model in a complete new line of lightweight portable electric power generators has been announced by LearCal Division, Lear, Inc., 3171 S. Bundy Drive, Santa Monica, Calif.

The Model 5900-B is a completely self-contained gasoline-engine-driven generator which continuously supplies 26 volts dc at 50 amps. Weighing about 30 pounds, the unit occupies no more than a cubic foot of space. A carrying handle and suction-cup feet are convenient features.

For further information write to the company, or use the Request Card at page 18. Circle No. 865

Lightweight Sub-Purlins For Roof Construction

■ The outstanding feature of the Blue Diamond Trussed Tee sub-purlin is its lighter weight than conventional bulb tees of equal strength. In addition, the built-in truss design of the sub-purlin has no solid vertical leg

Blue Diamond Trussed-Tee sub-purlin.

to conduct heat from top to bottom. This eliminates the tendency to form condensation on the bottom flange.

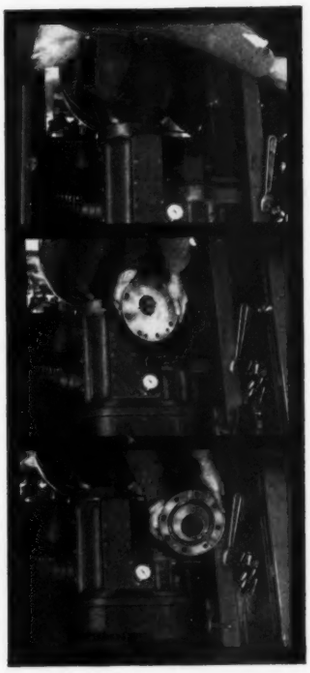
Consisting of two top cords of wire, a truss web of larger wire, and two angles of strip steel, the Blue Diamond Trussed Tee sub-purlin is manufactured in two types for various load-bearing requirements.

For further information write to Blue Diamond Co., 2722 Logan St., Dallas 15, Texas, or use the Request Card at page 18. Circle No. 866.

. . . and our torture tests say so

Every feature in the new Worthington Blue Brute Rotary has been proved and re-proved by many months of the most grueling tests we could dream up. Actually, that test period represents a span longer than the service life of the average compressor.

This powerful new rotary is ready now with *all* the features you want. Look below for three of the most important ones.



QUICK, EASY INSPECTION. For example, an unskilled mechanic can replace a rotor blade in a jiffy — right in the field! Photos tell story of speedy blade removal. (1) Take out machine bolts and remove bearing cap . . . with needle bearing in place. (2) End plate is removed without disturbing inner-bearing race on rotor shaft. (3) Rotor blade removed for inspection or replacement. That's all there is to it!

EASY-ACTING RELIABLE CLUTCH lets you warm up the engine *before* you cut in the compressor. Result: less wear and tear, quick starts *all* the time. Symmetrical clutch also assures vibrationless operation at all speeds and acts as safety connection between engine and compressor in case of serious malfunction of either.

NEW COMPRESSOR STAR! Besides its three big features, the new Blue Brute boasts a two-stage oil separator, low-set fuel tank, separate air and oil tanks, and shorter wheel base. It all adds up to the sturdiest, easiest-to-use, most *practical* rotary yet.

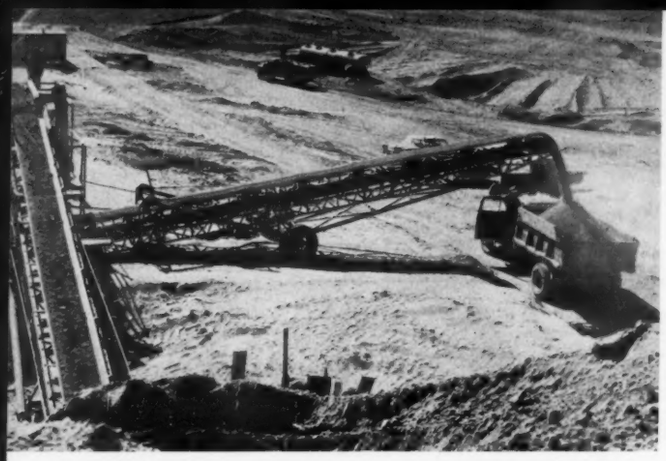
FULLY SELF-DRAINING COMPRESSOR eliminates settling of oil and water in cylinders, inter-stage chamber or discharge. The Blue Brute's unique cylinder arrangement gravity-drains *all* oil and moisture during shutdowns. Never any gummy accumulation to damage blades on cold starts.

If you haven't seen the new Blue Brute Rotary yet — see it now at your Worthington distributor's. Or write for Bulletin to Worthington Corporation, Section H.4.18, Harrison, N.J.

WORTHINGTON

IF IT'S A CONSTRUCTION JOB, IT'S A *Blue Brute* JOB

ROCK DRILLS • WAGON DRILLS • PAVERS • CONCRETE MIXERS • PORTABLE PUMPS



Crushed rock from a Pioneer 40-V rock plant moves along Pioneer 24-inch stacker conveyor belts to be loaded into waiting trucks. This plant supplies aggregate for the Lou Richardson contract.

Material from the stockpile at left moves over a Pioneer 24-inch conveyor belt to Lou Richardson's hot-mix setup. This contractor uses a Barber-Greene dryer and a Pioneer 101 Continuflo asphalt plant at this site.

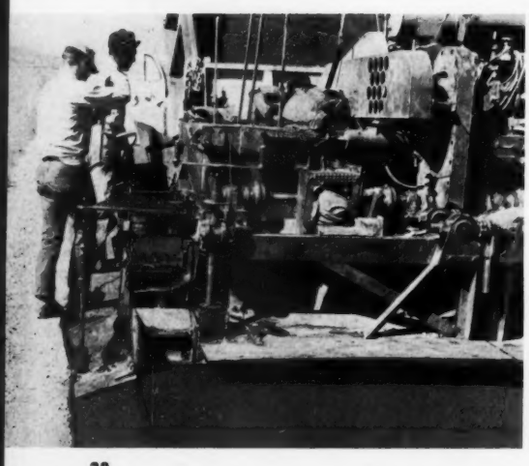
Bituminous paving requires good control of materials

by RAY DAY

Three contractors battle variations in aggregates to produce uniform job on 63 miles of highway

A Ford F-7 truck checks in on the scales after being loaded at Northwestern Engineering Co.'s Barber-Greene asphalt plant.

Each of the three contractors on the 63-mile paving job had Barber-Greene finishers lay down the 2-inch lift of plant-mix. Here a Ford truck completes unloading to a finisher.



The 12-inch beveled edge of the pavement on each side of the 24-foot roadway is formed by a sliding shoe attached to the side of the Barber-Greene. The road has no shoulders for its entire length.

The longest continuous paving job done thus far in Montana—a 62.5-mile stretch of U. S. 8 built under five separate contracts—gave each of the three contractors difficulties in base course and bituminous work from the start. The road was designed to be as similar as possible throughout its entire length. But though work methods and specifications were similar, there was a considerable amount of variation in both grades of asphalt and the gravel aggregates drawn from areas all along the extensive project.

Most of the old alignment and grade were retained from the old route, a gravel road with a 5-inch-thick base of crushed rock. The new two-lane highway called for retaining the old gravel base and adding new material to make an average base course 9 inches thick. Material specified was a 3-inch minus pit-run gravel, covered by 3 inches of leveling course granular material graded from ¾-inch down. This was topped by a 2-inch lift of plant-mixed bituminous surfacing laid 24 feet wide and having 12-inch beveled edges on either side. Lack of shoulders on the road made trouble for the contractors, since it gave them only a limited turning area for equipment.

Altogether, the entire job required 305,000 tons of select borrow base course gravel, 164,000 tons of type A ¾-inch-minus material for the cushion course, 280,000 gallons of MC-1 for the prime coat, 109,000 tons of plant-mix for the wearing course, and 1,400,000 gallons of penetration asphalt.

The new road provides a shorter route for motorists traveling between the Black Hills area of South Dakota and south-central Montana. Running between the Crow Agency and Broadus in Montana, the road is also 56 miles shorter than other routes between Rapid City, S. Dak., and the Montana entrances to Yellowstone National Park.

Starting near the site of Custer's last stand, the road runs across the Little Big Horn River, rises gradually from the plains into timbered country, and terminates 4,400 feet above sea level near Ashland, Mont.

Three Contracts

The Montana Highway Commission let the job in five principal contracts. A 12-mile contract, starting at the Crow Agency on the west end, went to Nilson-Smith Construction Co., Twin Falls, Idaho. The 38-mile adjoining section was built under three contracts by Lou Richardson, Miles City, Mont. On the extreme eastern end, a 13-mile section was constructed by Northwestern Engineering Co., Inc., Rapid City, and Denver, Colo.

Nilson-Smith, busy on several other road projects in Montana last summer, worked rented tractor equipment until early September to shape up the old roadbed on its 12-mile stretch. As fall started, the company's production of base course material went into high gear.

A completely portable shop-built feeder trap, beveled on all sides and equipped with a Cedarapids plate feeder and a conveyor belt with automatic scales, was set up in a rock pit designated by the plans. Pit-run material was fed to the trap by two Caterpillar D8's with U-type bulldozers, and a fleet of 15 rented 5-yard dump trucks hauled the material from this setup to the road.

Securing the 80,000 gallons of water required daily for the laydown and compaction of the granular base course was one of Nilson-Smith's biggest problems, for the only available

source of water aside from the Little Big Horn River was 12 miles distant. To beat this water problem, the contractor set a Gorman-Rupp 4-inch pump in the river and assigned two gravity-type water trucks to the hauling job. One was a 4,500-gallon unit mounted on an International L-190; the other was a 3,000-gallon unit on an International K-11.

Two Caterpillar No. 12 motor graders processed the gravel on the roadway while traffic was being carried through the job. Lack of space for a detour made it necessary to confine blading operations so that automobiles could use the road at all times. Gravel for the subbase was cut out and laid in lifts as thin as the thickest rock in the mix permitted. Rolling was done by Bros pneumatic straight-wheel rollers pulled by Minneapolis-Moline rubber-tire industrial tractors.

Aggregate Production

The ¾-inch-minus aggregate base course for the top or leveling blanket was produced by a Cedarapids Master Tandem set up near the west end of the project. Driven by a Murphy ME-66 diesel and a using 10×36 jaw crusher and a set of 40×22 rolls, this machine also turned out the ¾-inch-minus filler for the plant-mix surfacing. Approximately 40 per cent crushing was needed to do the job. The pit was fairly dry, permitting the rock-crushing setup to produce an average of 175 tons hourly.

Unusual in this setup was the method of building up the set of rolls with hardfacing. A Lincoln automatic 600-amp welding machine, used for this job, cut roll-building time by 300 per cent. Lincoln hardfacing rod and Lincoln flux was used, and the roll crusher was turned by a small auxiliary motor and speed reducer. The entire job was done quickly and with the generation of heat in the heavy metal pieces held to a minimum.

As the last section of subbase was being completed, Nilson-Smith was setting up a Barber-Greene continuous-mix asphalt plant at the Crow Agency. In about 14 working days during the balance of September and October, the company paved its 12-mile stretch with a Barber-Greene finisher and completed final rolling with steel-wheel units.

Richardson Job Toughest

The most difficult of the contracts were the three for the 38-mile section contracted to Lou Richardson. Gravel hauls on this, the biggest job, were as long as 15 miles in some instances. Water for gravel courses also required long hauls.

One of the company's worst problems was in the gravel pits, which produced an extremely light porous sandstone with a considerable amount of scoria. The soft material, powdering when crushed, produced an excess of No. 200 fines and was porous enough to hold as much as 8 per cent moisture. Tonnage on this job had been figured on the usual basis of 3,200 pounds in a cubic yard. But the material, weighing only from 2,500 to 2,620 pounds, cut about 20 per cent off the normal tonnage handled. With conveyor belts loaded to capacity, tonnage was still low.

The total quantities on this job—186,000 tons of base course material, 94,000 tons of ¾-inch-minus leveling course, and about 66,000 tons of plant-mixed bituminous surface—made it necessary to set up two rock-production plants. The first was located 12 miles from the west end of the 38-mile section; the second was about 13 miles from the east end. These provided the best material for the work, and the shortest possible hauling distances.

One of these plants was a Pioneer 40-V completely portable unit, driven through a flat-belt drive by a Caterpillar D13000 diesel engine. This plant made use of a 9×36 jaw crusher, 40×22 rolls, and Pioneer multiple-deck screens. Pit-run raw material was shoved as far as 600 feet into the plant by two Caterpillar D8 tractors

(Continued on next page)

The operator of a Caterpillar D8 equipped with U-type dozer moves gravel in one of Richardson's pits.

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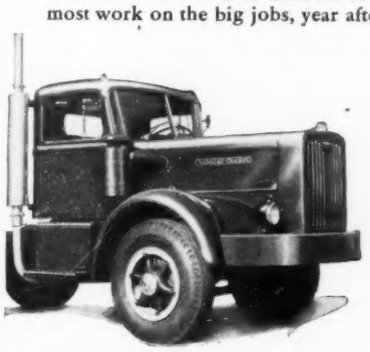
YOU GET *more* work out of an Autocar ... for longer ... because there's a lot more going into an Autocar than other trucks.

More of the things that count! Like custom engineering that you get only when you buy a truck tailored to your own business needs. And precision workmanship by the truck-building craftsmen at Autocar's modern, new plant.

Finest of materials, too! Like the frames made of high quality, heat-treated alloy steel rails.

Feature for feature, you get the best in Autocar ... the best of them all to do the most work on the big jobs, year after year.



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The "Pros" of the trucking industry know that the truck frame has to be right for the big jobs—the heavy loads—that torture ordinary trucks. Autocar frames, made of heat-treated alloy steel rails flex and spring under stress.

Ordinary cold-rolled carbon steel frames used in most trucks can't stand shock and hard wear. Permanent deflection results in misalignment of major units, vibration, and rapid deterioration.

Autocar frames are rigid enough to hold truck units in position ... flexible enough to stand rough going. No stress or strain.

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(Continued from preceding page)

with U-type dozers. Crushing ¾-inch-minus material at an average rate of 230 tons per hour, the 40-V worked full time to load rented trucks directly from the Pioneer 24-inch stacker conveyor belts.

The second crushing setup, operating in a nearby pit, consisted of a completely portable shop-arranged plant built about two years ago. Its feeder trap, beveled on four sides and mounted on rubber tires, had a Pioneer electrically-driven apron-type feeder which moved pit-run material toward the plant at high speed. Material falling from the feeder was delivered by a Pioneer 60-foot × 24-inch conveyor to a double set of Cedarapids 4 × 12 vibrating screens.

At these screens, part of the oversize was routed to a Pioneer 9 × 36 jaw crusher, while the remainder was sent through a set of Pioneer 40 × 22 rolls. Both crushers and the screen deck were arranged in a closed circuit so that several combinations of sizing could be developed. An auxiliary ⅛-inch slotted screen removed part of the No. 200 mesh fines.

Crushed rock passed from the plant on a Pioneer 24-inch × 50-foot stacker conveyor and was elevated to a Pioneer 21-cubic-yard bin used for surge storage. A 36-inch × 20-foot conveyor belt tapped the bottom of the bin to load a dump truck in about 60 seconds. Because of this loading speed, the surge bin was tended by operators rather than truck drivers.

Richardson's procedure in producing and laying the crushed gravel base was approximately the same as that used by Nilson-Smith. The surface of the leveling-course was similarly primed with 0.3 gallon per square yard of MC-1 asphalt.

Hot-Mix Production

The greatest trouble for this company arose with the use of crushed material as a mineral filler for the hot-mix. The scoria and light sandstone content, with a high moisture content, made drying difficult.

A Pioneer 101 Continuflo asphalt plant managed to handle a great deal of material, but only turned out about 90 tons per hour. Actually, 15 per cent more material was being fed to the plant, but No. 200 fines were either being blown out the stack or rejected by the screening system. This cut into production badly.

To overcome the snag, the firm brought in an old Barber-Greene dual dryer. Part of the filler was then routed to this dryer to relieve the plant's regular drying system. As a result, production shot up to 180 tons per hour. Material from two stockpiles was fed to the Pioneer feeder trap by a Caterpillar tractor and U-type dozer. Material from one pile passed over a Pioneer 24-inch conveyor belt moving directly into the secondary Barber-Greene dryer at the head of the plant system. Hot aggregate then passed over a Pioneer standard elevating conveyor belt, dropped to an incoming Pioneer belt which led from the second feeder trap to the plant's dryer.

The entire mix then passed through the electrically driven Pioneer dryer. Power for the dryer came from a General Motors diesel-driven generator. An electrically driven Ray burner, using low-pressure air as the atomizing agent, fired the dryer, and No. 5 fuel oil was used to remove moisture and heat the aggregate.

Aggregate from the dryer was hoisted by hot elevator to the screening unit which sized the material, rejected No. 200 fines, and dropped acceptable rock to the weigh hoppers. About two-thirds of the 38-mile job called for single-bin separation of the material, while the last portion called for two-bin separation.

A 250 to 300-penetration asphalt cement was used on the Richardson and Nilson-Smith jobs. The oil, trucked about 70 miles from Carter Oil Co's. refinery in Billings, Mont., was delivered to the site at flow temperatures and unloaded to horizontal tanks with a total capacity of 20,000 gallons. After being heated by steam from a Cleaver-Brooks 125-hp steam generator, it was pumped into the pugmill. Near the plant, the contractor had storage facilities for 8,000 gallons of No. 5 fuel used in the dryer, 2,300 gallons of gasoline, and 5,000 gallons of diesel fuel. The entire plant was completely portable, enabling the contractor to make fast moves. In one shift, the plant was shut down at 5 p.m. on a Saturday and was in operation at another site at 8 a.m. on Tuesday. And if the second dryer had not been used, the plant could have been in operation a day earlier.

From 6 to 18 rented batch trucks hauled the hot-mix from the plant to the highway, where a Barber-Greene finisher put down the material as fast as it was delivered. The machine was used at a 12-foot width and had a shoe on one side to form the 12-inch beveled strip on the roadway. The knockdown roll was made with a Galion 5 to 8-ton steel-wheel tandem machine, and final compaction was provided by a Galion tandem 8 to 12-ton roller.

Highest Elevation Section

The 12.1-mile section done by Northwestern Engineering ran through high mountainous country on the east end. Northwestern, working with better mineral aggregate than Richardson, had a job that was marked by good organization and fast operations.

A Cedarapids rock crusher produced the entire tonnage from one setup, as did the hot plant. Total tonnages were about one-third those on Richardson's job. The hot plant, consisting of a Barber-Greene 848 mixer, an 866 gradation unit, an 837 dryer, and an 851 dust collector, was driven by a Caterpillar D13000 en-

How to Do It with the New "4-in-1"

FOR BULLDOZING, CLAM IS OPEN and back of bucket becomes dozer blade, as shown by bucket control cylinder at left. With both blade and Skid-Shoes on ground, depth of cut is accurately and easily controlled by forward and backward pitch of dozer blade over the Skid-Shoes.

HERE'S A MONEY-SAVING BULLCLAM: new "4-in-1" digs the trench . . . spreads and compacts the refuse . . . transports, spreads, and compacts the fill . . . it's a one-man sanitation squad! And the new "4-in-1" can do dozens of other jobs around town.

New INTERNATIONAL DROTT "4-in-1" Does 4 Different Jobs at the Touch of a Hand . . .

This new INTERNATIONAL DROTT "4-in-1" Skid-Shovel on INTERNATIONAL TD-6 and TD-9 crawlers gives contractors and municipalities a whole new idea of what one man and one tractor can do!

Take a good long look—you've never seen anything like this before!

This versatile "4-in-1" Skid-Shovel is just what its name implies. Just a slight hand movement on the control gives you a unit that can do anything from loading to dozing and finish grading or unmatched performance in sanitary fill operations. Just shift the hydraulic-control rod to any of the four positions and your "4-in-1" is ready to use as a Skid-Shovel, a Bulldozer, a Bullclam, or a Clamshell. The big pictures show you. It's that simple.

And remember—all of these operations are done right from the operator's seat with one set of controls—without changing a single pin—while the crawler is moving or standing still.

Get the full story on what this new "4-in-1" can do for you—call your INTERNATIONAL Industrial Power Distributor for your demonstration right away.

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS
DROTT MANUFACTURING CORP., MILWAUKEE 8, WISCONSIN

gine. The plant also used a Cleaver-Brooks 125-hp steam generator, and an auxiliary diesel-electric generating set supplied the power.

For processing the mineral aggregate, the company added a second burner in the plant dryer, and dry steam was used to atomize the No. 5 fuel in the burner. Tanks provided an 8,000-gallon storage facility for this fuel. Storage capacity for the No. 3 boiler fuel used by the Cleaver-Brooks steam generator amounted to 5,000 gallons, and storage capacity for the 150 to 200-penetration asphalt cement used totaled 18,000 gallons.

Like the other contractors, Northwestern used a Barber-Greene finisher for the hot-mix paving and Galion steel-wheel rollers for compaction. The seal coat for the entire 63-mile stretch of road will be applied this summer. THE END

Folder Gives Details On Centrifugal Pumps

■ A new bulletin on portable self-priming centrifugal pumps has been issued by Worthington Corp., Harrison, N. J. The literature includes rating charts showing performance requirements under average job conditions for each size of pump.

All rating and capacity figures are listed in conformance with standards set forth by the Associated General Contractors of America, according to the company. Two tables list pumping-unit and engine data for the various models.

Specifications for Worthington's frame-mounted self-priming centrifugal pumps are also provided.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 813.

The Triumph Hydro-Clipper mower installed on an Allis-Chalmers Model D motor grader.

Hydraulic Mower Mounts On Motor Grader

■ The development of a hydraulic mower that can be attached to the Allis-Chalmers Model D motor grader has been announced by Triumph Machinery Co., Hackettstown, N. J. The Hydro-Clipper attaches with only 4 bolts and operates entirely from the hydraulic pump on the grader.

The mower is controlled from the grader cab, and the operator can instantaneously change from grading to mowing by moving a single lever. The cutterbar operates from 45 degrees below horizontal to a 90-degree vertical position.

A feature of the mower is that both the cutterbar and the specially-shaped Pitman housing float as a unit over obstructions.

For further infromation write to the company, or use the Request Card at page 18. Circle No. 871,

Conveyor Belt Idlers Have One-Piece Rolls

■ Troughing and return idlers for bulk-materials-handling conveyor belts are illustrated in a folder from Kennedy Van Saun Mfg. & Engineering Corp., 2 Park Ave., New York 16, N. Y. The Uni-Form idlers feature new one-piece steel carrier rolls.

A cut-away view shows this one-piece roll construction with tapered roller bearings. A double-labyrinth grease and dust-seal assembly is positioned on both ends of each roll shaft in a housing formed as an integral part of each roll.

Other features are pressed-steel carriers flash welded at the center of the roll, a large end roll radius for greater belt life, and one-piece formed steel end and center brackets. Charts and diagrams give complete details on dimensions.

To obtain Bulletin D-1002 write to the company, or use the Request Card that is bound in at page 18. Circle No. 901.

Girder Supports Simplify Concrete Ceiling Forming

■ The Hico girders, versatile supports for concrete ceiling forms, are shown in a folder from Webrib Steel Corp., 120 Broadway, New York 5, N. Y. The supports will carry forms and concrete on clear spans up to about 27 feet. Sections in several lengths and adjustable end-pieces provide variations in size.

The Hico girders have a 6-inch-wide top chord to carry form boards or prefabricated forms. Weighing 8½ pounds per foot, any single Hico section can be easily carried.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 896.

Skid-Shovel — Bulldozer — Bullclam — Clamshell

NEW INTERNATIONAL DROTT "4-in-1" does all 4 jobs — changes blade positions hydraulically in seconds — at the touch of your hand.

IN SKID-SHOVEL POSITION, "4-in-1" uses exclusive Skid-Shoes to give 300% greater break-out force than similar-sized competitive units . . . retains heaped loads with 41° bucket roll-back at ground level . . . skids bigger payloads.

NEW "4-IN-1" USED AS A CLAMSHELL is ideal for loading from stockpiles or from loose material in close quarters. Hydraulically operated clam opens wide for big load. Bucket can be rolled back 41° and semi-skidded when fully loaded. Note bucket control cylinder fully closed.

THE NEW "4-IN-1" CATALOG FREE

For your free copy of the "4-in-1" Skid-Shovel catalog, fill out the coupon and mail it today.

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Tubeless Tires Made For Large-Capacity Trucks And Heavy Earthmovers

■ Tubeless tires are rapidly being developed for use on large trucks and earthmoving equipment under a research, testing, and production program engaged in by the Goodyear Tire & Rubber Co., Akron 16, Ohio. Goodyear tubeless tires are now standard equipment on many small 1955 trucks and are on the market as replacement units in sizes up to 21:00.

Larger sizes are already in service on trucking fleets, and huge tubeless tires for earthmovers are being field tested by construction companies. Present plans call for the development of tubless tires up to 37.5 × 33 in size in the near future.

The extension of the Goodyear tubeless tire to every work vehicle from the small panel truck to vehicles carrying 50 tons was made possible by two developments in tire manufacture. The first of these was the Goodyear 3-T triple-tempering cord process that enabled the company to build an air-tight tire without a tube-like liner and to market it at the same price levels as those for conventional tire-tube combinations.

◄ The Goodyear Tire & Rubber Co. has developed tubeless tires for large trucks and earthmovers. This 50-ton Dart hauler is equipped with 18.00 x 25 Hard Rock Lug tubeless tires. The tires are mounted on the new Tru-Seal rim that has made large tubeless tires practical.

An entirely new 3-piece rim with a small rubber ring that acts as an air seal has been designed by Goodyear to accommodate large tubeless tires.

Because the top of the range for the best tubeless-tire performance with the conventional single-piece drop-center rim is reached at the 10:00 × 20 size, Goodyear also developed a radically new kind of tire rim, the Tru-Seal rim. This is simply a 3-piece rim with a small rubber ring which locks in the air. It acts as an air-tight container that maintains its effectiveness as an air seal for the life of the tire.

The design of the tubeless tire for the new rim is the same as that of conventional truck tires except for a very slight change in the bead base shape. The rim has the full flange height retaining the full support the flange has always given truck tires.

Furthermore, the Tru-Seal rim has been found to simplify rather than complicate truck tire mounting. It is mounted quickly without the aid of tools. The tubeless tire falls easily over the base, with the valve fastened to the rim. Tubes and flaps are eliminated.

For further information write to the company, or use the Request Card that is bound in at page 18. Circle No. 843.

Mobile Bucket Loader Moves 10 Tons per Minute

■ Over 3,000 tons of material per day is the capacity of a new, straight-line bucket loader, the largest ever built by N. P. Nelson Iron Works, Inc., 850 Bloomfield Ave., Clifton, N. J.

With a rated capacity of 10 tons per minute, the Model B-68 features hydraulic crowd, power steering, hydraulic controls, 20-mph road speed, 115-hp engine, four-wheel drive with four-wheel booster brakes, and Timken Detroit front and rear axles. The machine has been designed for easy accessibility for maintenance.

A twin-cylinder hydraulic boom hoist raises and lowers the boom. The swivel chute, with two removable extensions, is adjustable from 30 to 50 degrees and swings hydraulically through a full 180 degree arc. Maxi-

For faster job-cycles make it 2-Cycle Power

SPECIFY

GENERAL MOTORS DIESEL

in all your construction equipment

MODERN 2-cycle design is the main difference between GM Diesels and most other Diesels built today.

Two-cycle design means power on every piston downstroke. This is one of the reasons why a General Motors 2-cycle Diesel accelerates faster, responds to governor controls quicker, takes sudden shock loads in stride.

That means more work per shift from your equipment—means you can handle bigger contracts with fewer units, keep your capital investment down and your profits up.

But you get more than faster work when you *specify* GM Diesel power.

You get engines that are easy to service and maintain, that help you keep parts stocks low because of the high degree of parts interchangeability. You get engines that start at the push of a button with no auxiliary, even in wet weather and when it's cold.

And you get Diesel engines backed by a network of GM Diesel distributors ready to supply fast service and quick delivery of low-cost factory parts where and when you need them.

Today you can specify GM Diesel power in over 750 different models of equipment built by more than 150 manufacturers. Get their names from your local GM Diesel distributor or write direct for the list.

"QUICK SERVICE WHEN I NEED IT"

Iowa's Gene McClain Construction Company has GM Diesel power in this Cedarapids asphalt plant and in a shovel. Superintendent Jim Grundy says, "We've standardized on GM Diesel power for this operation because GM Diesels are economical to run. Dealer service is quick and good . . . the company stands behind their product."

GM GENERAL MOTORS DIESEL POWER

The new Nelson Model B-68 bucket loader.

mum discharge height is 14 feet 11 inches.

The new B-68 speeds up the working cycles of the largest trucks by minimizing the amount of maneuvering they must do under the chute and by distributing material evenly from front to rear in one smooth, continuous operation. According to the manufacturer, the new machine will efficiently load from as little as 1,000 tons per day to three times that amount.

For further information write to the company, or use the Request Card at page 18. Circle No. 857.

Cutters and Benders For Reinforcing Bars

■ A line of powered reinforcing bar cutters and bending machines is illustrated in literature from Klingelhofer Machine Tool Co., Industrial Park, Kenilworth, N. J.

Three models of cutters shown can handle 1¼, 1⅝, and 2-inch rounds, as well as squares and flats. The outstanding feature of the Simplex cutters is their rapid blade return. The return stroke of the cutting arm is three times faster than the forward cutting stroke.

The Perfect bar bending machine is available in three models, the largest of which handles 2-inch rounds. These machines make right and left-hand bends, without additional adjustment, by means of a single control lever. A variable-speed feature permits the operator to increase or decrease speed. This provides the correct torque required for bending bars of varying thickness with maximum efficiency.

Special attachments for the bar-bending machines include double-bending equipment, an attachment for bending and straightening spirals and rings, and stirrup-bending equipment.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 918.

Wood-Cutting Blades For Circular Saws

■ A new line of wood-cutting circular saw blades has been announced by Henry Disston & Sons, Inc., Philadelphia 35, Pa.

The Preferred circular saw blades are available in six sizes ranging from 6 to 12 inches in diameter. Six different types include rip, cut-off, planer (combination hollow ground), combination (flat ground), Safe-Feed, and flooring. These blades are designed for use on all bench or table saws as well as in portable electric hand saws.

For further information write to the company, or use the Request Card at page 18. Circle No. 905.

Coating Preserves Asphalt And Blacktop Surfaces

■ A new liquid material which protects and preserves asphalt and blacktop surfaces is announced by The Monroe Co., Inc., 10703 Quebec Ave., Cleveland 6, Ohio. Black Top Seal is applied in a thin coating over new or old surfaces to form a smooth and waterproof surface.

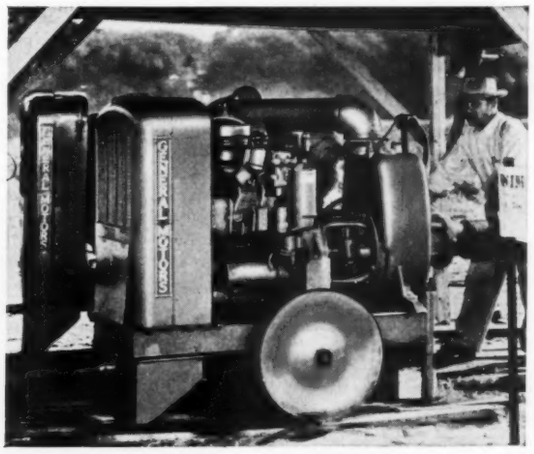
The coating is said to protect against abrasion, frost damage, blisters, and deterioration. Unaffected by sun and extreme temperatures, and impervious to oil and gasoline, the material is recommended for preserving blacktop roads, runways, loading docks, driveways, and parking lots. Easily brushed on, Black Top Seal forms a gray-black coating.

For further information write to the company, or use the Request Card at page 18. Circle No. 876.

Applied by brush, Monroe Black Top Seal is reported to substantially increase the service life of asphalt surfaces, such as runways, driveways, etc.

OVES 1000 YARDS IN 10 HOURS

d that's big production for a ¾-yard dragline. This GM sel-powered Unit has been working for Michigan con-ctors, Henry Schmid Sons, since 1946. Its General tors 2-cycle Diesel burns about 12 gallons of 14.9¢ sel fuel a day—cost only $100 for repairs in more than 00 hours of operation.



MULTIMILLION-DOLLAR DEPENDABILITY

Faced with wet footings on this multimillion-dollar sewage plant contract, Pittsburgh's Rust Engineering Company put GM Diesel-powered Jaeger dewatering pumps to work. Superintendent P. J. Pedone says, "The GM Diesel engines have proved very satisfactory . . . they're keeping footings dry so we can go ahead with the job."

M UNITS ALMOST DOUBLE OUTPUT

as' Reno Construction Company reports their new rapids portable rock crusher with three new GM els stepped up output from 200 tons per hr. to almost ons. One "6-110" Diesel powers the primary 36" x 45" le impeller impact breaker; a GM Twin "6-71" rs the secondary and a "3-71" powers the conveyors, and feeders.

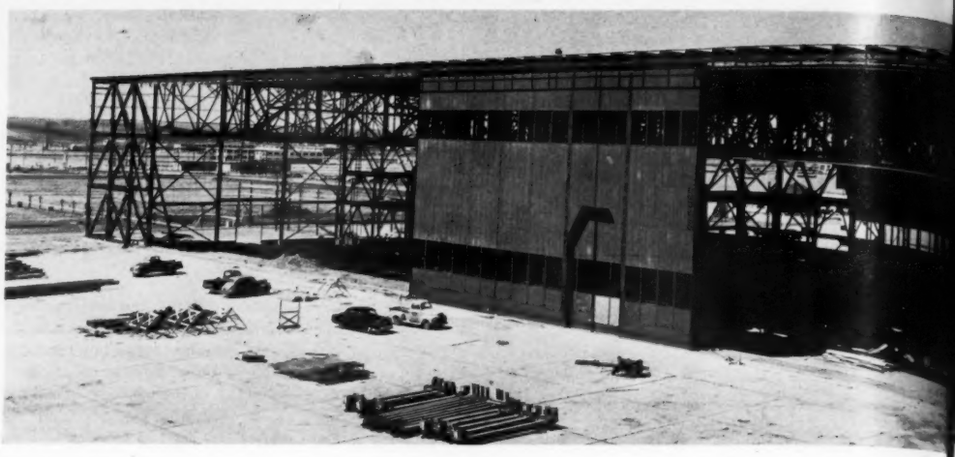
25% MORE WORK FROM GM DIESEL POWER

One of the best known excavating companies in Northern New Jersey and New York State is Raymond L. Cole Construction Co. "Our GM Diesel-powered American shovels do at least 25% more work than other Diesels in the same number of hours. They are more flexible," reports this user of one 1½- and three ¾-yard shovels . . . all GM powered.

DETROIT DIESEL ENGINE DIVISION

GENERAL MOTORS • DETROIT 28, MICHIGAN

Single Engines . . . 30 to 300 H.P. • Multiple Units . . . Up to 893 H.P.



Steel framework completed, work continues on the roof, floor, and inside partitions of one of the maintenance hangars being built under a rehabilitation program at Lincoln Air Force Base, Lincoln, Nebr. Four double-cantilever trusses project 93.5 feet each way from central bents to support the roof.

Double-cantilever trusses support huge hangar roof

Two identical steel maintenance buildings, 250 x 350 feet, provide large unobstructed working area for air base

Their cantilever arms outstretched like sheltering wings, two huge new maintenance hangars now provide ample space for aircraft and the men who repair them at Lincoln Air Force Base, Lincoln, Nebr. Each of the hangars measures 250 × 350 feet and occupies more than two acres of ground. The basic supports of their roofs consist of four double-cantilever trusses which project 93.5 feet each way from central bents. Sliding panels make up the 350-foot-long sides of the building, and any number of the door panels open to admit planes. Maximum door openings on either side of both buildings are 320 feet.

From the outside, the hangars resemble rectangular structures. With door panels fully opened, a wide expanse of unobstructed floor area and the deep overhead trusses reveal that these are no ordinary buildings. What appear to be three towers in each building are actually the block walls of three shops. One is located near the

Cut cost of **LABOR** *and* **LUMBER**

Stop waste of **TIME** *and* **MONEY**

USE NEW ROOSHORS
(EXTENSION TYPE)

The one man shore . . . adjustable to any height, any fraction of an inch. 3 Shores in one . . . as a FLAT-HEAD, a MALE-HEAD or an EXTENSION shore for the high stories. You actually save 3 ways . . . money, material and manpower. Try them on your next job and see for yourself!

ROOSHORS and Roos Column Clamps are available for rental with purchase option from warehouse stocks in principal cities.

Write for Bulletin 355.

ROOS COLUMN CLAMPS BIG ADVANTAGES

2 Identical Units • Open Either Way • Longer Bars, greater strength • Cannot be put on wrong • Need only hammer to tighten.

One Contractor writes . . . "Our Rooshors (Extension Type) are proving very useful. We are extremely well pleased with them. We particularly like these NEW Rooshors. We can use them anywhere on any job and they are so easily put in place."

You'll agree, once you try the Rooshor (Extension Type) . . . this is the most versatile shore of them all.

Manufactured by BAKER-ROOS, Inc., 602 West McCarty Street, Indianapolis 6, Indiana

GET ALL THE FACTS — MAIL COUPON TODAY

C&E BAKER-ROOS, Inc., P. O. Box 892, Indianapolis 6, Ind.
Gentlemen: Please rush additional information on Rooshors and Roos Column Clamps, without obligation.

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Company.....
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FOR ALL TYPES OF TRENCHERS

HEAVY DUTY WHEELS

Fabricated of high alloy steel for long wear.
Standard ¾", ⅞", or 1" thicknesses, or to specification.
Standard or specified diameters.
Holes pre-drilled for bucket installation.

Shipped ready for installation.

Photo of Cleveland 320 heavy duty wheel, buckets and teeth.

HEAVY DUTY BUCKETS

Fabricated from high quality steel in ⅝", ¾" and ⅞" thicknesses. • No further welding or hole drilling necessary. • Jetco weld-on pockets give added strength to bucket. • Pre-drilled holes for side-cutters included.

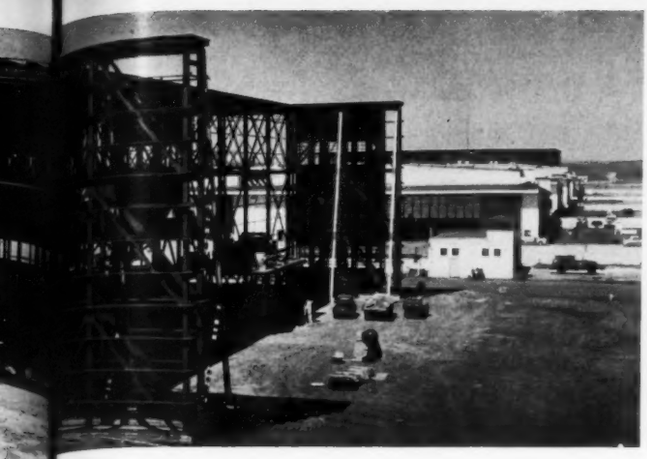
Shipped ready for installation.

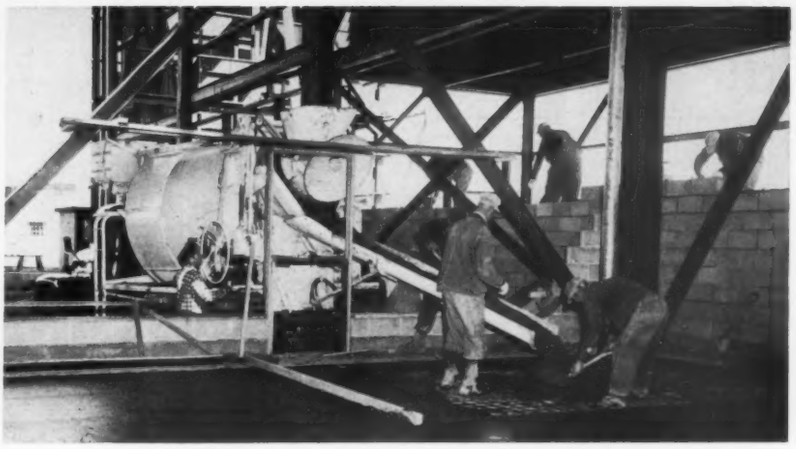
HEAVY DUTY TEETH & POCKETS

Drop-forged, weld-on pocket with smooth radius for positive taper fit with Jetco Jiffy Teeth—no bolts. • Self-sharpening, quick change, reversible teeth of high quality steel for longer wear. • Teeth designed for all types of soils. • Minimum leading edge leverage.

Write for catalog

JETCO, INC.
Dept. C, 1100 Westminster Avenue
Alhambra, California





Concrete for one of the shop-section floors is chuted directly into place by a Rex transit mixer mounted on an International R-190 truck. Shop rooms have a ceiling at first-story level, and additional floors can be added if needed.

center of the building and the others are located at either end of the hangar. The steel bents which support the roof trusses are built into the walls of these rooms.

Each of the four main double-cantilever roof trusses is founded on a central bent 63 feet wide. From the edges of the bent, the trusses cantilever 93.5 feet in both directions to span the 250-foot width of the hangar. The first truss is located 70 feet east of the west wall of the building. The next is 100 feet further east, and the other two are spaced at intervals of 60 feet. This places the fourth truss 60 feet from the east wall. Supplementary trusses span the spaces between the big cantilevers and between the end walls and the cantilevers.

In the 100-foot bay between the first and second cantilevers, the trusses have a highly arched lower chord which provides a minimum vertical clearance of 60 feet through a substantial part of this bay. Throughout the rest of the hangar, the minimum vertical clearance is 40 feet. The shop rooms which fall in the first, third, and fifth bays are all 63 feet wide and 60 or 70 feet in length, depending on the width of the bays. Shop rooms have a concrete ceiling at first-story level, and provision has been made for adding additional floors if they are needed.

Concrete floors in the hangar area are 20 inches thick, while the concrete floors in the shop areas are 6 inches thick. Each hangar contains 8,200 square yards of the 20-inch pavement, which is approximately the same as a fair-sized highway-paving job. The grid of pipes for the radiant heating system and for other utilities made the laying of this floor a good deal more complicated than a normal paving job, however.

Altogether, the two hangars cost slightly more than $4,500,000. Both were built under the construction and

STANDARD STEEL PRESSURE DISTRIBUTOR

FULL CIRCULATING SPRAY BAR GIVES UNIFORM SPREAD OF MATERIAL THROUGHOUT LENGTH OF BAR . . .

SIMPLIFIED PIPING PERMITS FAST LOADING AND LAYING . . .

✓25% More Asphalt shot per day! Faster loading! No delays Starting! Instant cleaning at end of run! These are facts known to every operator of **Standard Steel Pressure Distributors!** Why? Because of the simplified piping in this equipment! The full circulating spray bar contains submerged valves which are quickly heated and remain uniformly hot at each point of pouring. The throw of a single lever opens and closes all valves instantly. Every inch of the spray bar delivers precisely the same material output—lightest or heaviest bituminous material. And there are 12 other special features that make this equipment outstanding in performance. Write for catalog 424 today for complete details.

OTHER PRODUCTS
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Built to the Highest Standard

PD3

Standard Steel Works, NORTH KANSAS CITY, MO.

McKissick blocks are engineered to meet all requirements in capacities ranging from 5 to 500 tons.

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CONSTRUCTION BLOCKS
Designed for Lower Operating Cost and Maximum Efficiency

Alloy steel, flame hardened sheaves CUT wire line costs and sheave replacements.

Extra large center pins and and bearing assemblies MINIMIZE friction losses, pin and bearing replacements.

Extra weight and balance PREVENTS slow, wobbling falls.

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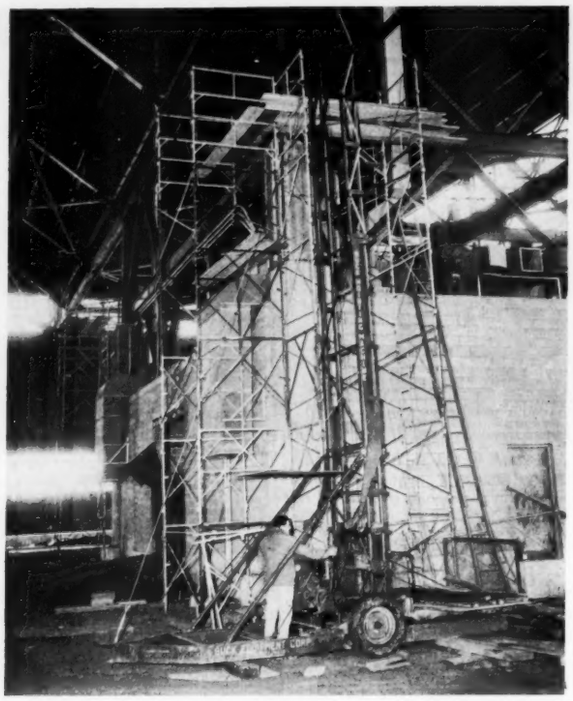


A Buck portable 47-foot tower with a 2,000-pound capacity is used to hoist materials to crews working inside the hangar. The tower can be moved to a new location and set up for work in a few minutes.

Building blocks, used to construct the walls of shop areas, are cut to exact size by a Clipper masonry saw with 12-inch diamond-edge blade. Power for the saw and other equipment is supplied by an Onan 5,000-watt generator.

rehabilitation program being supervised at the base by the Omaha District of the U. S. Army Corps of Engineers. As of the end of last year, more than $20 million worth of work was under contract for the program.

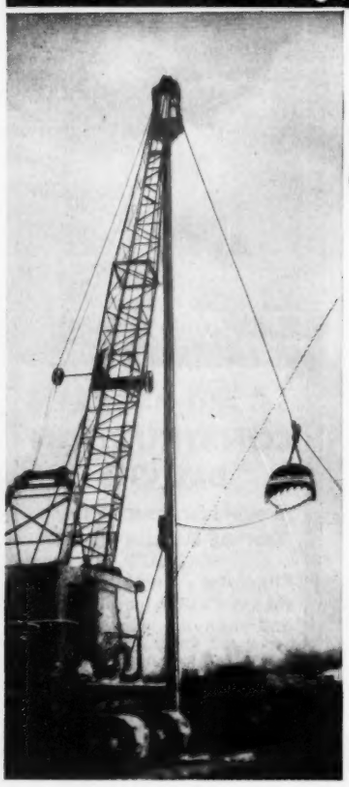
Pile Foundations

Construction of the hangars started in January, 1953, by Olson Construction Co., Inc., Lincoln, with the demolition and removal of buildings occupying part of the hangar sites. The furnishing and placing of concrete footing piles was sublet to Raymond Concrete Pile Co., New York, N. Y. Twenty piles—twelve vertical and eight batter—were first driven in each of the eight main footings of each hangar. The 1,262 piles driven for the two structures varied from 45 to 65 feet in length. Steel casings were driven by Raymond and filled with concrete supplied by Ready-Mix Concrete Co., Lincoln.

Footings were carefully excavated

"We Didn't Build a Bridge, We Moved a River"...

A. S. Wikstrom, Inc.



One Sauerman Scraper helped by spreading 200 cu. yds. of muck per hour

Spreading 260,000 cu. yds. of plastic material as excavation progressed in the rechanneling of the winding Clyde River was one of the jobs done by A. S. Wikstrom, Inc. in the Thruway construction near Seneca Falls, N. Y.

A 6-cu. yd. Sauerman Crescent Scraper, equipped with carrier and track cable, working from a 1½-cu. yd. crane handled the job at the rate of 200 cu. yds. per hour. Length of haul was about 300 ft. An Athey Wagon served as an anchor for the track cable and provided the necessary mobility. A spud was used to support the boom and also allowed the operator to take advantage of almost the full boom height for fast gravity return of the scraper to digging point.

This set-up supplanted an earlier recasting arrangement using several machines. It operated at a considerable savings over previous cost.

For more details on the Clyde River project ask for Sauerman News No. 139. Request Field Report 219 and Catalog J for specific information on the use of scrapers with boom machines. Sauerman engineers will tell you the largest Crescent scraper your dragline can handle, if you will give us the make, model and boom length of your machine. For information on the use of scrapers with tractors, request Field Report 209 and Bulletin No. 160.

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616 S. 28th AVE., BELLWOOD, ILL.

BRADEN WINCHES ARE:

★ SAFE: Up to 50% more reserve pulling and holding power than ratings indicate.

★ STRONG: Engineered for ruggedness. All moving parts, such as worm gears, made of steel and bronze alloy.

★ GUARANTEED: All BRADEN "M" Series Winches are guaranteed against defective workmanship & material for 1 year from date purchased.

BRADEN Truck Winches are engineered with as much care as many more complicated machines. Special alloys make them lighter but special engineering combines minimum dimensions with maximum strength.

Sure-action controls and the patented Oil-Cooled, Fully Automatic Safety Brake make the operator's job easy and safe. Longer, dependable service under the most strenuous conditions make BRADEN your best truck winch buy.

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P. O. Box 547, Broken Arrow, Oklahoma

BRADEN Winches

by hand, and the concrete was placed against the earth sides without forms. Concrete was chuted directly from the truck mixers to the footings. On the strength of this project and other construction on and near the base, the Ready-Mix Concrete Co., set up a plant near the base to minimize haul distances. This plant furnished all concrete for the hangars, including that needed for the heavy floor pours.

Erection of the structural steel framework was sublet to John F. Beasley Construction Co., Muskogee, Okla. Beasley first assembled and erected the frames for the four door pockets—which stand at the corners of the building as independent structures—and the central towers containing the bents for the cantilever trusses. After trusses were assembled on the ground in sections weighing up to 26 tons each, a Lorain ¾-yard truck crane and a Koehring 604 on crawlers set them in place. Truss sections were supported on temporary falsework towers during erection stages. Structural steel was fabricated by Stupp Bros. Bridge & Iron Co., St. Louis, Mo.

Million Pounds of Doors

The door sections enclosing both 350-foot sides of each hangar stand almost 65 feet high and weigh a total of one million pounds. Fabricated by Truscon Steel Co., a division of Republic Steel Corp., they were erected by Western Steel Erection Co., Oklahoma City, Okla., which rented Olson's P&H 25-ton motor crane for the job.

Galbestos exterior sheathing was applied over the metal frame by Olson Bros. Inc., Omaha. A template was used to insure accurate location of Weldstuds welded to the girts. Holes were punched in the sheathing according to the same template so that the sheets could be slipped over the studs and the ends peened to complete the attachment. Crews installing the sheathing worked from swinging scaffolds outside the building.

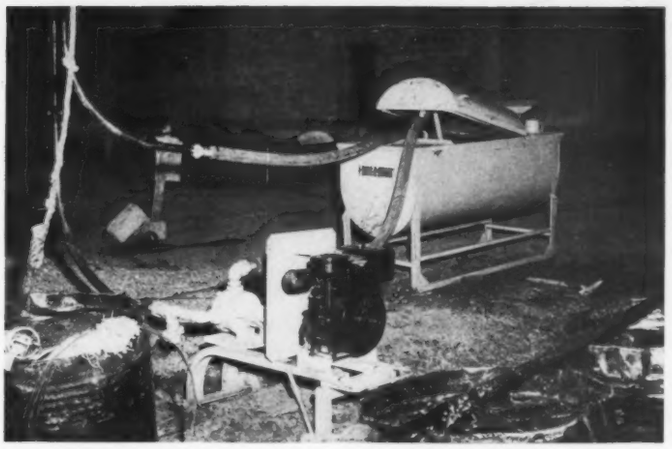
Concrete Construction

Concrete floors for both the main hangar areas and the shop rooms were placed from ready-mix trucks. The 20-inch-thick floor was placed in strips 18.5 to 22 feet wide. The air-entrained concrete was vibrated with Jackson vibrators as it was placed, and struck off with a vibratory screed. The finishing crew used three Whiteman mechanical trowels to produce a smooth finish. Curing was done with Sisalkraft paper.

On small pours, such as the encasement of structural steel in the shop areas, concrete was hoisted to the forms by an improvised crane mounted on a war surplus halftrack. After the mix was discharged from the truck mixer into a concrete buggy, the buggy was picked up by a crane with a cable sling and lifted to the platform where the pour was being made. Workmen on the platform dumped the concrete into the forms and vibrated it with a Jackson electric vibrator while the crane returned the buggy for another load.

Walls of the shop areas were constructed of concrete building blocks cut to accurate size and shape by a Clipper masonry saw with 12-inch diamond-edge blades. Since a central source of electric power was not convenient at this stage of construction, an Onan 5,000-watt generator supplied power for the saw as well as for miscellaneous equipment. Another piece of equipment the contractor found particularly useful was a portable Buck 47-foot tower hoist. Powered by a Wisconsin engine, and with a capacity of 2,000 pounds, this machine was used to hoist material and supplies to crews working inside the building. The tower can be quickly and easily dismantled and the entire machine towed on its wheels to a new location where it can be back in operation in a few minutes.

Olson Construction Co. set up a field office on the base from which to operate this and other projects. A Motorola mobile radio system served to keep this office in touch with the men on the jobs. The job office housed a 15-watt base station, and a mobile set in the superintendent's pickup had the same power. Four Handi-Talkie



Roofing asphalt heated in the Aeroil Heet-Master tank is pumped more than 65 feet to the roof of the maintenance building by the Viking asphalt pump that appears in the ground.

BROS tip sheet EXTRA

50 HP, TORQUE CONVERTER DRIVE, FULL OSCILLATION FEATURED IN NEW BROS SELF-PROPELLED ROLLER

MAT RESURFACING, SEAL COAT JOBS AND SHALLOW LIFT COMPACTION... DONE SMOOTH AND FAST BY BROS SP-54!

Minneapolis, Minn. "This sonuvagun is just what I've been looking for in a pneumatic tire roller!"

... That's the standard reaction from the many road contractors who've gone over the new BROS self-propelled 5 x 4 pneumatic tire roller with a fine tooth comb.

Backed by special design and exhaustive testing, the SP-54 is unquestionably the nigh perfect machine for mat resurfacing, seal coating and compaction jobs in the shallow lift range. And it's easy to see why:

Torque converter drive, 3-speed transmission and shuttle gear provide the smooth, high maneuverability needed for the exacting compaction results being specified these days. Combined with the 50 hp engine, you've got a smooth flow of real power at 0 to 18 mph speeds — both forward and reverse.

FULL OSCILLATION

Here, take a look at the full oscillation of all wheel pairs on the SP-54. This feature is engineered into the front wheel pairs as well as the rear for even load distribution for uniform compaction densities... 2,000 lbs. per wheel or 265 lbs. per lineal in. of rolling width.

100% COVERAGE

One-half in. overlap of wideface front and rear tires provide solid coverage over entire surface. Drawing shows overlap and the flow of compaction exerted to knead out surface voids. On seal coating, this BROS "first" correctly imbeds sand without any grinding or crushing action.

POSITIVE CHAIN DRIVE

Tractive effort is maximized by positive chain drive to *all* rear wheels. Dual chain drives smoothly transmit drive power so there's no wheel spinning or tearing up seal coat surface.

FORE AND AFT VISIBILITY

In both forward and reverse, the operator sees and knows exactly where he's at... another example of how steady, uniform compaction work is inherent in the SP-54's design. Note easy accessibility of shut-off valves under operator's seat for optional front and rear water sprinkler bars.

EASY HANDLING BY HYDRAULIC STEERING

UNIFORM hydraulic steering of the SP-54 gives you sure, smooth control at all engine and roller operating speeds. High turning angle for easy turn around.

Shuttle speed feature of this new roller saves time by eliminating turn-around on short road beds. It eliminates the bugaboo of tipping over chips frequently done by tow tractors — in fact, it saves cost of tractor, too!

DOUBLE BRAKING, NO "DEAD WHEEL" IN REAR

Hydraulic brakes on both rear wheel pairs can be operated simultaneously or separately — as you see here. Loss of tractive effort on one wheel pair is quickly corrected by braking it; this transfers needed drive power to other pair. As is obvious, there's no "dead" wheel to get unit "hung up" on extreme surface contours.

18 FOOT TURN AROUND

Turning radius of the SP-54 is 18 ft., 5 in.; faster job completion because there's no lost motion — busy from morn til night. The SP-54 is built by BROS, the world's largest manufacturer of pneumatic tire compaction equipment.

So get in on lower compaction costs and the best results possible — *right now*. For complete information, write: The Wm. Bros Boiler & Mfg. Co., 1057 Tenth Avenue S.E., Minneapolis 14, Minnesota.

hand sets, weighing only 13 pounds each, were used by the various crews as needed. The superintendent's pickup was also fitted with a mobile telephone connected with the Bell Telephone system, and this made it possible for a person in the vehicle to send or receive telephone messages at any time and at any place.

Time and cost records were kept at the field office. Information for payrolls was supplied by this office to the main office in Lincoln, where the payrolls were made up. The information was then sent to IBM at Omaha for permanent recording on punchcards.

Personnel

General superintendent for Olson Construction Co. was Lyle Mehuron. Job superintendent for the construction of the hangars was George Alt, Jr. Kenneth F. Dodge is chief engineer for the company. Homer Rosser served as superintendent for Beasley on the erection of the steel frame.

This project was constructed under supervision of the Omaha District, U. S. Army Corps of Engineers, of which Col. Thomas J. Hayes, III, is district engineer. Area engineer on the base was Earl W. Fiala. Almer Stark was assistant area engineer.

THE END

Folder on Form Grease

■ A folder covering the advantages of Globe form grease is available from Borne, Scrymser Co., 632 S. Front St., Elizabeth, N. J. The paste emulsion is applied to steel or wooden concrete forms by spray, brush, or swab to reduce peeling and pitting to a minimum.

Globe form grease is stainless, leaves a white smooth surface, and eliminates the need for painting forms. One gallon covers about 200 square feet.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 892.

Joy Mfg. Appointment

Managing the Dallas, Texas, district office for Joy Mfg. Co., Pittsburgh, Pa., is Darrell Smith. He succeeds J. A. Noyes, who has retired.

Mr. Smith, who has held a number of positions with the Joy company, had been serving as manager of distributor sales since 1950, working from the home office.

The Elliot rotary chipping machine, which cleans brick and concrete, can be used to clean concrete forms and to remove rust from equipment and metal surfaces.

Chipping Machine Speeds Concrete Form Cleaning

■ A hand-held rotary chipping machine cleans concrete and cinder aggregate from forms and molds and removes form marks from poured concrete. The machine is also suitable for cleaning rust, scale, or paint from large metal surfaces. It cleans a 4-inch swath in one pass and will clean to within 1 inch of a vertical surface.

Vertical and horizontal handles on the chipping machine make it easier for the operator to control and to maintain even pressure on the surface to be cleaned.

Special attachments permit the machine to do wire brushing, grinding, buffing, and polishing work.

For further information write to Elliott Mfg. Co., 214 Prospect Ave., Binghamton, N. Y., or use the Request Card at page 18. Circle No. 881.

Flexible Plastic Cable

■ A new plastic cable available in standard ⅛ to 1-inch rope sizes is reported to have high mechanical and impact strength. Made of du Pont Mylar, the strongest of all polyester films, the cable is impervious to water and highly resistant to solvents and chemicals. The flexible cable has a thermal stability over a temperature range from minus 70 degrees to plus 300 degrees F.

The plastic cable may be spliced in the same way as regular fiber rope and may be cut with the "hot knife" method. The cut ends will heat-seal to prevent unraveling.

For further information write to Reynolds Industries, 4500 Euclid Ave., Cleveland, Ohio, or use the Request card at page 18. Circle No. 852.

Bulletin on Hand Pumps For Dispensing Liquids

■ The complete line of Blackmer rotary hand pumps for dispensing liquids is described in a new bulletin available on request.

The literature gives a detailed discussion of the full line. Performance features, application information, and other pertinent data is discussed. Using illustrations, the bulletin shows the basic pump styles offered, as well as accessories for various applications.

To obtain Bulletin 320 write to Blackmer Pump Co., 1809 Century S. W., Grand Rapids, Mich., or use the Request Card at page 18. Circle No. 818.

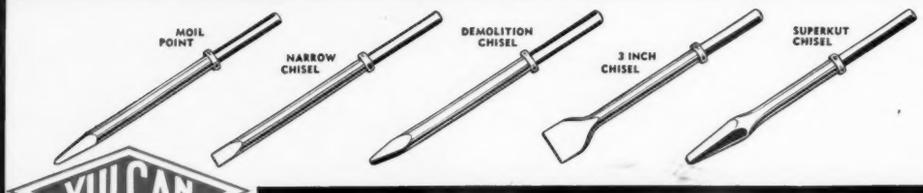
"...and carry a BIG STICK!"

WHEN breaking up concrete and other paving materials, you want to break the pavement, not the tool. So use the big stick . . . use a Vulcan Super Service Pavement Breaking Tool. Made from round steel, these tools contain more metal than hexagonal steel, thus they are heavier, stronger—the big stick for hard hitting hammers.

All Vulcan Super Service Tools are forged from high grade electric furnace steel, and hardened to Vulcan's rigid specifications. Each Super Service Tool is absolutely guaranteed against breakage, provided resharpening is correctly done.

Specify VULCAN *for:*

PAVEMENT BREAKING TOOLS
CLAY DIGGING TOOLS
DRILL STEELS
PNEUMATIC HAMMER TOOLS
ELECTRIC HAMMER TOOLS
HAND TOOLS FOR CONCRETE, STONE, AND STEELWORKERS



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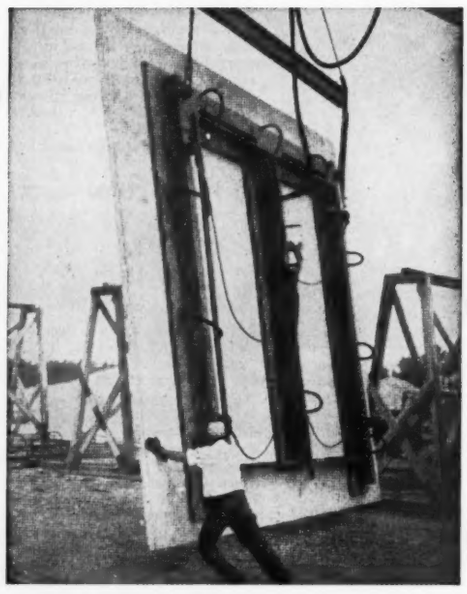
Next time you order from your distributor, say "VULCAN", and see the difference.

MAGIC CARPET *for Concrete Handling*



THE VACUUM LIFTER

No inserts or strongbacks to adjust . . . a turned valve does the work. Harnessed atmospheric pressure provides temporary reinforcement — eliminates point stresses and the need for additional steel.

EARLY STRIPPING — EARLY ERECTION

VACUUM CONCRETE, INC.
4210 Sansom Street • Philadelphia, Pa.

Contractor: Concrete Casting Co., Kansas City, Mo.

Imported Survey Transit

■ A survey transit used widely in airport construction in the Far East is now available in this country through Umeco Optical Division, 465 California St., San Francisco 4, Calif. Weighing only 9 pounds, the transit is especially suitable for field work where minimum weight is desirable.

The instrument has a 5-inch-diameter horizontal circle and 4½-inch-diameter vertical circle. Both read to 30 minutes with vernier readings to 1 minute.

A 9-inch telescope gives 23-power magnification. Stadia lines are fixed at a 1 to 100 ratio.

The manufacturer emphasizes that this imported instrument is made to American standards under American supervision and is thoroughly rechecked upon arrival in this country.

For further information write to the company, or use the Request Card at page 18. Circle No. 933.

Compression Testers For Concrete Samples

■ The complete Forney line of compression testers for concrete is illustrated in a new folder.

Photographs and text explain the operation and working features of the Model LT-500, which has a 350,000-pound capacity for testing cylinders, cubes, blocks, bricks, beams, and lintels. This tester consists of two basic machines; one for compression and flexure tests, and the other for tension tests.

Among other machines illustrated is the Model QC-100, a compression tester designed primarily for ready-mix plants, highway departments, and contractors whose testing needs are confined to standard 6×12-inch cylinders.

Another machine shown, the QC-110-S, will test both cylinders and beams. Also shown is the PT-75, which tests 12 to 72-inch ID pipe under compression.

To obtain this literature write to Forney's Inc., 209 Elm St., New Castle, Pa., or use the Request Card at page 18. Circle No. 824.

Anchor Bolts Designed to Hold Securely in Concrete

■ Preformed, ready-to-use anchor bolts, designed for anchoring to concrete, are now being produced by Pittsburgh Screw & Bolt Corp., P. O. Box 1708, Pittsburgh 30, Pa.

The Pittsburgh anchor bolts are made in an angle design to hold in concrete securely. They are furnished with square nuts and washers.

Sizes available include 7 lengths ranging from 6 to 18 inches in ⅜ and ½-inch diameters.

For further information write to the company, or use the Request Card at page 18. Circle No. 864.

Whitney Export Manager

Now serving as export manager for Whitney Metal Tool Co., and for Rockford Brass Works, both of Rockford, Ill., is Ralph A. Colorado. Mr. Colorado, a graduate of the Georgetown Law School, Washington, D. C., has had a considerable amount of experience in working with distributor's salesmen in foreign countries and in developing sales and distribution programs abroad.

EASY-TO-MOUNT TRACKS for trucks, tractors, cranes, and similar rubber-tire equipment provide extra traction and flotation over mud, snow, sand, and rough terrain. These tracks fit most tires, and are easily adjusted to various sizes of tires, and for different road conditions. The P&G Supply Co., 2262 N. Albina St., Portland 12, Oreg., supplies them in standard tracks of 15 inches for single and tandem axles. The concern also offers 18-inch tracks for larger tires. For further information write to the company, or use the Request Card at page 18. Circle No. 955.

PHOTO COURTESY HARNISCHFEGER CORPORATION, MILWAUKEE, WISCONSIN

Flexibility of Modern Chrysler High-Speed Industrial Engines Proved in 375 Ampere Arc Welder

Here pictured in construction is a New York City garbage disposal dump located on the North River near 135th Street. When completed, trucks will drive up its ramps and discharge loads into cubicles located over scows. Scows will then convey refuse to a watery grave.

On this job, three P&H WN-302 Arc Welders have been putting in five 8-hour days every week welding cubicles, not only joining steel members but also giving them added strength for years to come. Chrysler Ind. 30 Engines power Harnischfeger 375 Amp. Welders supplying enough extra power to compensate for possible generator loss and still provide reserve for overload.

Within their 230 to 413 cubic inch displacement range, Chrysler Industrial Engines offer the high-speed performance construction equipment demands. Each engine is a compact, relatively small unit which will permit installation in virtually any type of construction equipment regardless of size or silhouette. Besides size, weight and cost advantages, should it become necessary, Chrysler Industrial Engines offer fast, easy parts replacement service with dealers located all over the country.

In considering power for your equipment, remember Chrysler offers its industrial engines built to meet the needs of the equipment with such items as gyrol Fluid Coupling; Chrysler Industrial Torque Converter; 3-, 4- or 5-speed transmissions; heavy-duty clutch and power takeoff; velocity, belt or gear-driven governors; gas, butane and propane burning carburetors available for factory installation.

With Chrysler Power too, you do not pay a premium. Production-line methods adapted to specialized industrial engine building provide a custom-built Engine at mass-production prices. See a Chrysler Industrial Engine Dealer or write: ***Dept. 115, Industrial Engine Division, Chrysler Corporation, Trenton, Michigan.***

CHRYSLER INDUSTRIAL 30 Engine
230 cubic inch displacement

CHRYSLER *Industrial Engines*

INDUSTRIAL ENGINE DIVISION • CHRYSLER CORPORATION

HORSEPOWER WITH A PEDIGREE

AGRICULTURE INDUSTRY CONSTRUCTION OIL FIELDS

Concrete for the chemical building of the Kalamazoo, Mich., sewage-treatment plant is delivered to the site in transit mixers, transferred to buggies, and hoisted in this steel tower.

This Griffin wellpoint system lowers ground-water level around the digester tanks to permit excavation in the dry to a depth of 18 feet below normal ground water level. Approximately 110 wellpoints operated by 8-inch pumps dewatered the area. *C&E Staff Photos*

Wellpoints dewater groun[illegible]t s[illegible]

Approximately 12,000 cubic yards of concrete reinforced by 1,354,800 pounds of steel has gone into the solid walls and thick floors of structures comprising the new sewage-treatment plant at Kalamazoo, Mich. Designed and constructed especially to withstand the onslaughts of flood water, the $2,300,000 facility went into operation last spring after an 8-month construction period.

Construction of this municipal treatment plant was an important step in a concerted campaign to clean up the Kalamazoo River. Large paper mills in and around the city are constructing their own waste-treatment facilities, and other industries and cities which discharge waste into the river between Kalamazoo and the outlet of the river at Saugatuck on Lake Michigan are taking steps to reduce the pollution load on the stream.

Because the new sewage-treatment plant stands on the bank of the Kalamazoo River, floors and walls below flood level had to be designed for extra strength. As a consequence, basement floors are as much as 30 inches thick, and the waterproofed walls have no openings below flood level.

General contractor for the project was a joint venture of C & C Construction Co., Inc., Fort Wayne, Ind., and Clifton Engineering Co., Inc., Three Rivers, Mich. Jones, Henry & Williams, Engineering firm of Toledo, Ohio, designed the facility and supervised construction.

Deep Excavations

Prior to the awarding of the construction contract, the site was prepared by the placing of 4 to 5 feet of sand fill which was dredged hydraulically from the riverbed. The initial

Setting steel tunnel supports with hydraulic jacks saves time and money...

• **What's Going On Here?**—Look how these heavy steel crown rib tunnel segments are raised and held in exact position with 20-ton hydraulic jacks until the complete rib is in place and bolted together. One man governs the action of these jacks by operating remote control valves. If unstable ground conditions should be encountered another set of jacks can be quickly set up to provide immediate support to the roof, sides and face until the next rib can be advanced and set. Spacer angles bolted between the ribs locate and tie the ribs together into a composite labyrinth. Shallow-depth formed steel lagging plates bolted to the outside of the ribs furnish protection from spalls and provide a surface to support back packing.

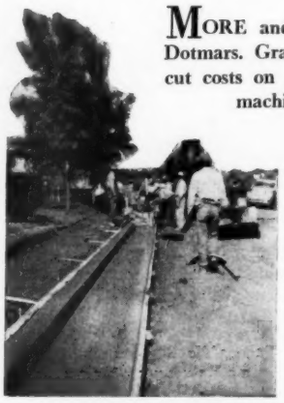
• **What This Means for You**—Using the hydraulic jack method requires fewer men in the erection crew and ribs are set into place faster—erection cost is less. Erection equipment takes up less space because these jacks telescope into such a low shut height in their closed position and space in the heading of a tunnel is really at a premium. No stoppage in the mucking operation is necessary while the bore of this tunnel is being trimmed and the steel supports set. The whole cycle in driving and supporting the heading is speeded up and this means additional savings.

"Commercial", with a background of years of experience, designs and furnishes complete tunnel support systems using the strength of steel in its most efficient treatment. No matter which steel tunnel support products are recommended—ribs, lagging, spacer angles, wall posts and beams, liner plates, hydraulic jacks—because they are all made by "Commercial" you may be sure of a system that gives you the lowest cost benefit of every ton of steel used.

The Commercial Shearing and Stamping Company, Youngstown, Ohio—Chicago, Ill.—Salt Lake City, Utah.

COMMERCIAL
shearing and stamping

DOTMAR CURB, GUTTER and SIDEWALK PAVERS are Cutting Costs Coast to Coast!



MORE and more contractors are cutting costs with Dotmars. Granite Construction Co., Watsonville, Calif., cut costs on 14 miles of integral curb and gutter with machine shown. Pays for itself in first mile of paving. Lays 5 to 10 lineal ft. per minute. Any shape curb or gutter. Greater concrete yield. Simple extension for paving sidewalks. Send for Bulletin 53.

Ask the Man Who Uses One.

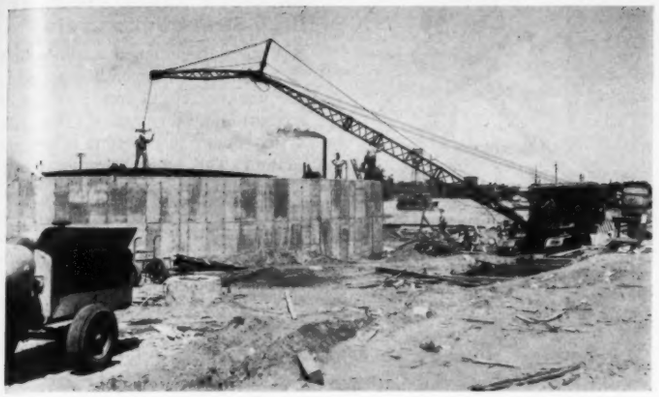
DOTMAR AIR HAMMER

Weighs only 3½ lbs. 7" long. Fits hand like a pistol. Power like a cannon. For drilling concrete, chipping, caulking, riveting, sheet metal cutting. Only $49.75. Send for Bulletin 154.

Dotmar INDUSTRIES Inc.

519 HANSELMAN BUILDING KALAMAZOO, MICHIGAN

CONTRACTORS AND ENGINEERS



With its boom and jib extended at a low angle, this Lorain crane makes a long reach to set steel for the floating cover of one of the secondary digester tanks. The Le Roi 105-cfm compressor at left supplies air for pneumatic tools.

This view of the two primary digesters for the new plant shows the Griffin wellpoint system surrounding the base of the tank in the foreground. At left, an Insley crane uses a buggy to remove debris from inside the tank.

...t sewage-treatment plant

System lowers water table 18 feet at site near river; heavy concrete construction guards against floods

excavation for structures was done by a subcontractor, Canonie Excavating Co., South Haven, Mich. Using three Tournapull C Roadsters push-loaded by an Allis-Chalmers HD-20 tractor, the grading contractor excavated about eight feet deep, which brought him to ground-water level. Excavations for deep structures were made large enough so that wellpoints could be set at the water level outside the structure lines. Banks were sloped back so that no sheathing was required to support them.

Griffin wellpoint systems were installed around the perimeter of the structures and pumped to lower the ground-water level. The general contractor then continued to excavate within the wellpoints down to a maximum of 18 feet below normal ground-water level. This excavation was done by three draglines—a P&H 1½-yard machine and Lorain and Insley ¾-yard cranes. As many as 110 wellpoints were used in the dewatering operation, with the pumping being handled by 8-inch pumps.

Spread concrete footings on the sand support all structures except the Vacuator, which rests on piling. This structure is a circular tank 45 feet in diameter and is supported on 40 Union Metal Monotube piles averaging just under 20 feet in length. The pile shells, made of 7-gage steel, were driven by a McKiernan-Terry 9-B-3 hammer powered by air from 600 and 300-cfm compressors. After being driven, the piles were filled with concrete.

Design Features

A number of factors in the design and construction of the plant will help it to resist floodwaters of the river. For example, floors of the deep structures are especially thick to provide strength against water pressure from below and to provide ballast against flotation. Main floor elevations of buildings are set above anticipated flood levels, and the waterproofed basement walls below this level have no openings.

The three principal buildings—the L-shaped main building, chemical building, and filter building—have solid concrete walls up to main floor elevation, which is about four feet above normal ground level. Superstructures above main floors consist of reinforced-concrete frames with exteriors of buff brick and Indiana limestone. Where interior walls are finished they are largely glazed tile. The construction of these three buildings from the main floor up was done

(*Concluded on next page*)

3-TIMES FASTER

MASONRY & CONCRETE CUTTING WITH

*DTA BOART

DIAMOND BLADES

Customers' reports say that *DTA BOART Diamond Blades are cutting Concrete Products, Glazed Tile, Fire Brick, Glass Block up to 3 times faster than with conventional blade.

You get consistently better performance and superior, low cost cutting with new *DTA Diamond Blades.

6 BIG REASONS WHY *DTA IS YOUR BEST BUY

1. Outstanding research and development.
2. Precise control of manufacturing process.
3. Highest quality diamond BOART.
4. The best in metal bondings.
5. Top quality steel centers.
6. Complete sales and field service by experienced personnel selected for their knowledge of your cutting problems.

FITS EVERY SAW: Regardless of type of saw used, new *DTA BOART Diamond Blade cuts any Concrete or Asphalt. Precise specifications available for all concrete green, cured or aged, any aggregate.

*DIAMOND TOOL ASSOCIATES

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WRITE FOR FREE LITERATURE, PRICES AND NAME OF YOUR NEAREST DEALER

Specify kotal to obtain a quality controlled, superior, plant mix for stock pile or immediate use.

ADVANTAGES:-

- Tough
- Durable
- Stable
- Cohesive
- All weather use
- Resists stripping
- Easy to use
- True economy

ALKOTE

Superior coating and anti-stripping agent—use it in surface treatment,—penetration,—mixed in place,—travel plant.

Write for detailed facts about KOTAL and ALKOTE

kotal COMPANY

360 SPRINGFIELD AVENUE SUMMIT, NEW JERSEY

PROCESS BITUMINOUS MIXES

(*Continued from preceding page*)

under a subcontract by Miller-Davis Co., Kalamazoo.

For one of these structures, the contractor set up a steel hoisting tower operated by a GMC hoist powered by a Le Roi engine. Column forms of vertical 2-inch lumber were set up on the floor and tied with Universal column clamps. The beam and slab floor for the second story was formed with ¾-inch plywood sheathing on 4×4 joists and stringers supported by 4×4 Dayton shores. Beam forms were tied with Dayton form ties. Concrete was delivered to the job by Statler Ready Mixed Concrete Co., Inc., Kalamazoo, in truck mixers. It was discharged into buggies, hoisted in the tower, and wheeled to the pour. Construction of the other buildings was similar.

The remaining structures, which are primarily circular tanks, were built by the general contractor. Universal Uni-Forms were used throughout to form the tank walls. Some of the tank pours were made with the P&H crane using an Insley 1-yard laydown bucket; others were made by the Lorain or Insley crane using a Gar-Bro ¾-yard bottom-dump bucket. These same cranes set the various pieces of equipment in the tanks and assisted in the erection of the covers for the digesters.

Installation of a large amount of underground piping was done during a period of low ground-water level so that most of the excavation could be done without wellpoints. The draglines dug wide trenches with sloping sides so sheathing would not be required. Concrete pipe in sizes up to 54 inches in diameter and cast-iron pipe up to 42 inches in diameter was installed.

When the structures were completed up to finish grade, the grading contractor returned and graded the surrounding area, using the material he had excavated for the building foundations. Landscaping around the buildings was one of the final steps.

New interceptor sewers and lift stations throughout the city were constructed under a separate contract, with Getman Bros., South Haven, as general contractor.

Items in addition to the concrete and reinforcing steel included more than 50,000 cubic yards of excavation for both structures and pipeline.

More than a million dollars of mechanical equipment has been installed in the various units of the treatment plant. This equipment includes a pump well containing four large pumps—one of 6, one of 8, and two of 12-mgd capacity—powered by two gas and two electric motors, a Venturi tube for metering the sewage, a Dorr Vacuator, chemical building equipment, and a number of digesters.

Personnel

John Murphy was superintendent for the joint venture of C & C Construction Co., Inc., and Clifton Engineering Co., Inc. John Van Dyke supervised the building construction for Miller-Davis Co. Resident engineer for the consulting engineers—Jones, Henry & Williams — was Coburn C. Metcalf. Donald Swets, formerly sanitary engineer for the Kalamazoo Department of Public Works, is now superintendent of the new plant. THE END

Pipe Tool Power Drive Mounted on Sturdy Tripod

■ A new lightweight power drive for power operation of hand pipe tools has been announced by the Ridge Tool Co., Elyria, Ohio. The Ridgid No. 200 drive is mounted on a new type of folding tripod with integral tray. The legs and tray fold in compactly for easy carrying by a built-in handle on the power unit.

Powered by a specially designed motor, the power drive is equipped with the Ridgid Speed chuck that grips pipe, conduit, or rod tightly by the turn of a hand wheel. A centering device automatically centers and holds the pipe by a turn of a cam and revolves with the pipe.

The power drive will handle ⅛ to 2-inch pipe or conduit, and ¼ to 2-inch bolts. It is powered for geared tools up to 12 inches in size.

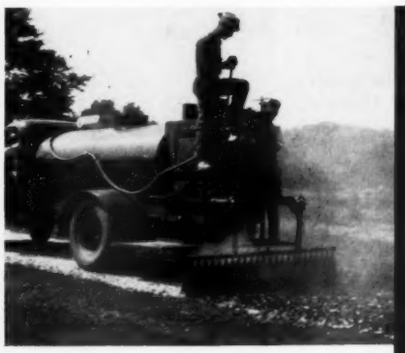
The Ridgid No. 200 power drive.

For further information write to the company, or use the Request Card at page 18. Circle No. 893.

Imported Mixer Produces High-Strength Concrete

■ A specially-designed mixer with a thorough mixing action is reported to produce concrete of very high tensile strength in a short mixing cycle while saving up to 30 per cent in cement content. The Liner Cumflow mixer, imported from England, has found use in precast, prestressed, and pretensioned concrete construction requiring high-tensile-strength concrete. It is also used on large construction jobs where limited quantities of high-strength concrete are required for machinery beds and similar purposes. Because of its thorough mixing it is also recommended where only inferior aggregates are available.

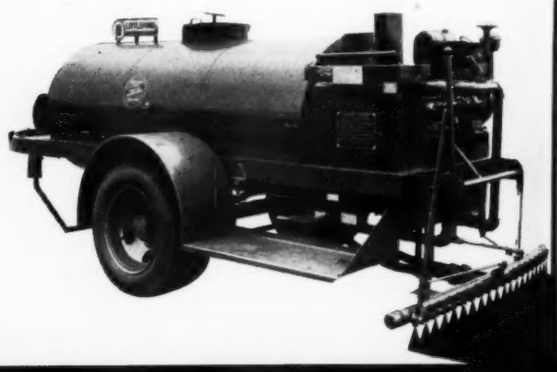
The higher tensile strength of the concrete produced by the Liner Cumflow mixer is credited to the machine's



Your choice of mountings:
Truck mounted type (above), 2-wheel trailer (right), or 4-wheel trailer. Wider choice, better buy!

101 UTILITY SPRAY TANK

Single unit does any kind of patchwork. The Littleford 101 comes equipped with (1) a circulating spray bar up to 10-ft. wide for small application jobs . . . (2) a hand spray attachment for patching by hand . . . and (3) there's an outlet for filling pouring pots for small crack and joint filling. Get the facts before you buy . . . send for bulletin 5.



ROAD EQUIPMENT
road construction and maintenance

BITUMINOUS SUPPLY TANK 102

Littleford supply tanks are your most efficient means of hauling hot or cold bituminous materials from the source to your Littleford Bituminous Distributors, Trail-O-Distributors, stationary or traveling mixing plants, bulk storage or asphalt mixing machines. Model 102 shown below. For complete information, write for bulletin 25.

BITUMINOUS SUPPLY TANK

Littleford engineered and quality built, these tanks will last for years, cost you less to own and operate. Model 103 tandem axle design shown above.

Equipment with BUILT-IN ENGINEERING LITTLEFORD

LB LITTLEFORD

LITTLEFORD BROS., INC.
485 E. Pearl St., Cincinnati 2, Ohio

unusual mixing pattern. Three-tined paddles rotate eccentrically over the mixing pan, with the materials continuously fed to the mixing blades by the revolution of the pan. With this arrangement, the normal time required for the cement to absorb all the moisture in the mix is considerably reduced, so that complete mixing is reached in half a minute.

The mixer is available in 6½, 10, 14, 20, and 40-cubic-foot stationary models and in a 10-cubic-foot portable unit. Provided adequate batching facilities are available, 45 batches or 17 cubic yards can be put through the 10-cubic-foot model per hour.

For further information write to Andrews Machinery of Washington, Inc., 3640 E. Marginal Way, Seattle 4, Wash., or use the Request Card that is bound in at page 18. Circle No. 847.

◄ With accurate batching and close control of water content, the Liner Cumflow mixer produces high-strength concrete in a short but thorough mixing cycle. Water content is controlled through an integral water tank.

Welded Aluminum Pipe For Construction Uses

■ Production of welded aluminum construction pipe has been announced by Aluminum Company of America, 758 Alcoa Bldg., Pittsburgh 19, Pa. The new product, Alcoa Alclad welded construction pipe, is particularly recommended for unusually corrosive applications. It supplements the Alcoa line of extruded construction pipe.

The Alclad pipe has a thin layer of a special aluminum alloy on both its inner and outer surfaces. This coating, which is an integral part of the pipe, gives protection to the 3004 aluminum alloy core under many corrosive conditions.

The new welded construction pipe is available in 3, 4, and 6-inch diameters and in 20, 30, and 40-foot lengths. Prices and wall thicknesses are the same as for Alcoa's extruded aluminum construction pipe. Yield and bursting strengths are approximately the same as those of 6063-T6 extruded pipe.

For further information write to the company, or use the Request Card at page 18. Circle No. 868.

Improved Chip Spreader Has Simplified Control

■ A simplified control on the transmission is the latest improvement on the Grace chip spreader for applying cover stone on seal and other surface treatment work. Both clutching and reversing operations are now controlled by a single lever.

This spreader also features built-in transport wheels. Models 10 feet and

wider are equipped with 6 wheels, two of which are readily removable together with the axle to a position at the end of the machine. A tongue is provided at the other end. One man can make the change from the operating to the transport-wheel arrangement.

Another feature is that the wheels on the Grace spreader have been designed so that they may be removed without taking the rim apart. This permits quick replacement of a flat tire with an inflated spare.

For further information write to W. E. Grace Mfg. Co., 6003 S. Lamar St., Dallas, Texas, or use the Request Card at page 18. Circle No. 841.

For Diesel Tractors

■ A new booklet showing the Sherman front-end loader for Fordson Major diesel tractors is available from Sherman Products, Inc., 3200 W. 14 Mile Road, Royal Oak, Mich. It describes the Model AJ-25 with a 2,500-pound capacity, and the Model AJ-20 with a 2,000-pound capacity.

The booklet contains on-the-job illustrations, along with details on special accessories, features, and specifications.

To obtain this literature write to the company or use the Request Card that is bound in at page 18. Circle No. 822.

NEW!

TRAIL-O-PATCHER

Bituminous Mixer

7 ton hot / 2 ton cold } capacity

The first self-contained, all-in-one, all-weather bituminous mixer. It's the first all-day mixer, thanks to its huge 200-gallon asphalt tank. Has its own bitumen metering system and aggregate drying compartment. Does such a thorough mixing job, it's practically dust-proof.

Littleford designed, engineered and built, the new Trail-O-Patcher is your most practical answer to the rising cost of road maintenance. Send today for bulletin 28.

LITTLEFORD

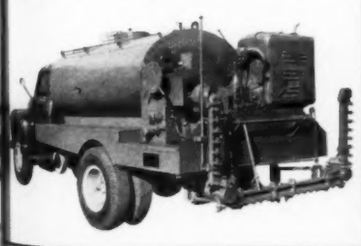
paves the way for lower cost

NEW!

Model D

SPRAY LEADER

State highway departments like the new Spray Leader . . . because it's the ***first low cost distributor*** you can buy with the right amount of equipment for your requirements—no more, no less. And with the Model D you get ***your choice of two types of circulating spray bars:*** automatic or mechanical. Most important, the Spray Leader has the same operating system used in the more expensive Littleford distributors. It's a good, basic distributor . . . your best buy. Send today for free descriptive bulletin 14-D.



Mechnical Toll Taker Receives Change and Counts It; Photographs Plates of Offenders Sneaking Through

■ An automatic camera photographs the license plates of motorists who fail to pay correct fares, trapping those who try to defraud the mechanized toll collector now being tested at the New Jersey Garden State Parkway's Raritan toll plaza. In addition to collecting proper fees and detecting cheating, the robot toll taker automatically records a full log of its transactions.

It is anticipated that the Toll-O-Matic collection system, a development of Taller & Cooper, 75 Front St., Brooklyn, N. Y., will speed traffic flow at toll stations and reduce the number of toll-booth attendants needed.

Motorists deposit their tolls in a large open-mouth receptacle. Mounted alongside the toll booth within easy reach of the driver's arm, this box sorts and counts any combination of nickels, dimes, or quarters.

If the amount is correct, the motorist gets an immediate green light. But if he has attempted to outwit the gadget with insufficient funds or if he tries to pass by without paying, an alarm goes off, red signals flash, and the camera is automatically cocked.

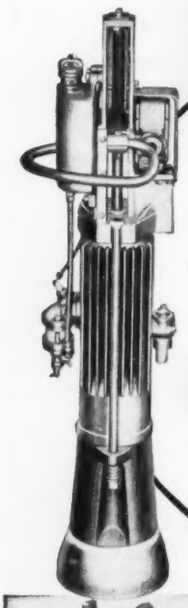
The wheels of the offending driver's car trip the camera shutter and a picture of his license plate is snapped. If it is dark, floodlights flash on so that the camera can do its work.

Approaching cars are advised that the automatic collector is in operation by a series of road signs beginning about a half mile in advance of the toll station.

Robot toll collector counts change dropped into cash box by driver. If the amount is wrong an alarm bell rings and red signals flash. Camera at top snaps license plates of driver trying to sneak through.

For further information write to the company, or use the Request Card at page 18. Circle No. 834.

For the LOW BID on any job, figure your costs with BARCO



BARCO *Gasoline* **RAMMER**

BETTER BUILDING CONSTRUCTION! This job called for high degree compaction. The Barco Rammer did it at the rate of 1 to 1½ square yards per minute with 12" to 20" lifts and handled from 160 to 240 cu. yds. per 8 hour day.

SOIL COMPACTION is here to stay! *Specified Compaction* is now accepted practice on all modern construction projects. The BARCO RAMMER gives you specified compaction on these jobs at very little extra cost. Time after time, it has been proven that no other type of equipment can match BARCO PERFORMANCE:

- Better work! Easy to meet specifications calling for 95% to 97.5% (modified Proctor) compaction.
- Ideal for work in restricted areas: inside buildings, close to walls, culverts, and abutments—in trenches, ditches.
- Faster compaction! 20 to 30 cu. yds. per hour—day in and day out.
- One man operation! Completely self contained; no auxiliaries needed.
- Low operating cost. Low initial cost.
- SAFE! Simple to operate. Operators like Barco Rammers.

CUTS TRENCH COSTS! Using lifts up to 24", this Rammer finished backfill in 18" trench at a rate of 360 to 600 feet per hour for quick completion of job and no cost for additional backfill.

ASK FOR A DEMONSTRATION—See for yourself—ask for our nearest distributor to give you a demonstration. Catalog No. 621 on request.

BARCO *Manufacturing Co.*

518F Hough St., Barrington, Ill.
A Chicago Suburb

NOW! QUICK DELIVERY FROM FACTORY STOCK!

SERVICISED PRODUCTS *for Concrete Paving*

The average concrete paving job, whether it be an airport runway, a city street, or a state highway or turnpike, requires the use of four groups of Servicised Products. The first of these is **AIR ENTRAINING AGENT** added to the concrete at the mixer to produce a more durable concrete.

Premolded Expansion Joint Fillers

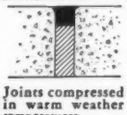
KORK-PAK — an exclusive Servicised development — is the all-purpose concrete paving joint filler. Composed of cork granules bonded together with asphalt between two sheets of heavy asphalt saturated paper. **KORK-PAK** is the *lowest cost non-extruding joint filler on the market*. **KORK-PAK** recovers more than 80% of original thickness after compression, and has a very low rate of moisture absorption. Available in ¼", ⅜", ½", ¾", and 1" thicknesses and standard lengths of 5 or 10 ft. Longer lengths available on special order. The Servicised premolded joint filler line also includes Asphalt, Cork, Self-Expanding Cork, and Sponge Rubber types, as well as Longitudinal Tongue and Groove Joint and premolded Dummy Contraction Joint.

Joint Sealers

Para-Plastic Hot-Poured Joint Sealer is an extremely stable rubberized asphalt compound that forms a resilient, adhesive and effective seal — keeping the joint completely protected under any and all conditions of temperature, moisture and traffic. Para-Plastic is pumped directly into the joint from the melting kettle.

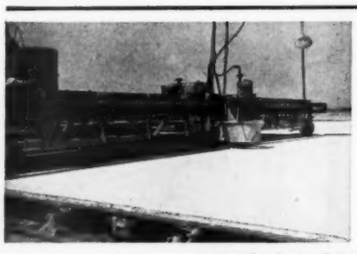
Para-Plastic JF for airport paving has the sealing characteristics of the standard compound, but in addition is impervious to solvents and jet fuel spillage.

SERVITITE Cold-Applied Joint Sealer is a bituminous rubber sealer so compounded that it can be pumped cold from the drum in which it is shipped directly into the joint to be sealed.



Joints compressed in warm weather temperatures

Joints opened in sub-zero temperatures



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Available in two types—White Pigmented and Clear. Sprayed or painted on concrete, they form a uniform, moisture-retaining membrane to insure proper curing. Pigmented type reflects heat, reducing temperatures as much as 15°; Clear type, available with fugitive dye to assist in getting uniform coverage is used indoors or where natural color of the concrete must be retained.

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Literature on Boilers

■ New literature on the Cleaver-Brooks self-contained boilers is available on request. The booklet's review of the new CB boilers includes articles and discussions of such features as low noise level and operating efficiency. Illustrations of the boilers show installations, demonstrations, and cut-away views.

To obtain Bulletin AD-144 write to Cleaver-Brooks Co., 326 E. Keefe Ave., Milwaukee 12, Wis., or use the Request Card at page 18. Circle No. 888.

Portable Asphalt Patcher Makes Repairs Quickly

■ A portable handy asphalt patcher that makes it possible to repair breaks when they first appear is made by Buhl Machine Works, Buhl Idaho. Set over the cleaned hole, the O'Hadi patcher heats both the asphalt batch above and the hole underneath. This properly conditions both the old and the new asphalt so that they will adhere.

The patcher has a flame screen positioned just above the ground. This screen does not allow the flame to contact the parent oil, but does transmit the heat. The O'Hadi patcher is reported to work equally well under all weather conditions.

A shear plate built into the patcher smooths and levels the patch after compaction with the truck wheel. With both the patch and ground heated, there is sufficient time to properly campact and level the patch before it loses its heat.

For further information write to the company, or use the Request Card at page 18. Circle No. 883.

With the portable O'Hadi patcher, a break in asphalt pavement can be repaired quickly, before further damage. The patcher heats both the batch of new material and the cleaned-out hole to be patched.

Standard Wye or Dumpy Level

1. Covered glass reticles (no delicate wires to break)
2. Coated optics, outstanding illumination and clarity
3. Internal-focusing telescope for dust protection
4. Covered leveling screws, no threads exposed

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5. Leaf-type tangent springs; smooth-acting, unaffected by dust and dirt
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Made in 18" Wye or Dumpy models with rigid tripod and mahogany carrying case.

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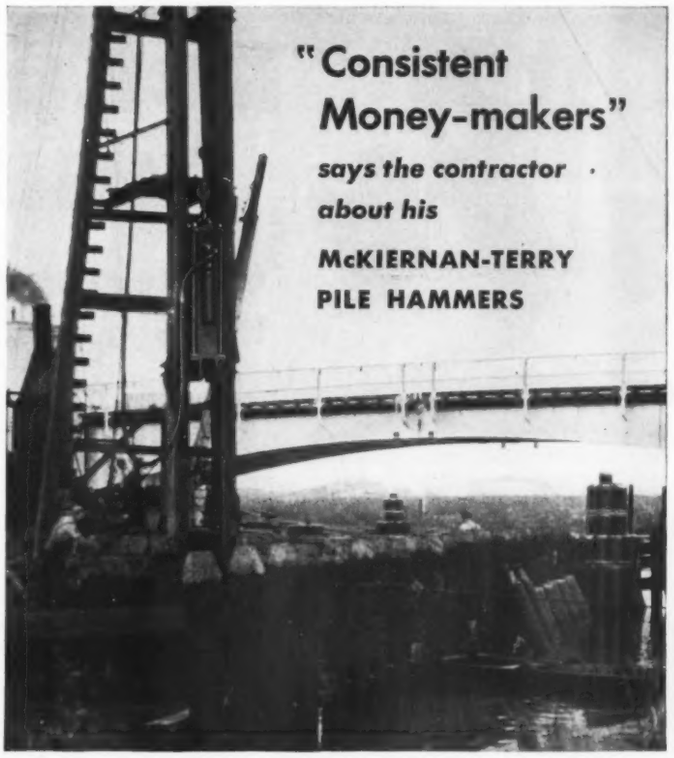

"Consistent Money-makers"

says the contractor about his

McKIERNAN-TERRY PILE HAMMERS

The Spence & Howe Construction Company of Port Arthur, Texas, is one of thousands of contractors who have profited by using powerful, fast-acting McKiernan-Terry Pile Hammers. President O. B. Hartzog reports:

"Our two McKiernan-Terry Pile Hammers have always performed beyond expectations and with a minimum of maintenance. They have consistently made money for us, particularly on jobs involving batter piles and difficult places to maneuver heavy pile driving equipment, such as under existing bridge spans, inside of buildings and close to existing refinery units."

Write for bulletins describing the money-making McKiernan-Terry Pile Hammers.

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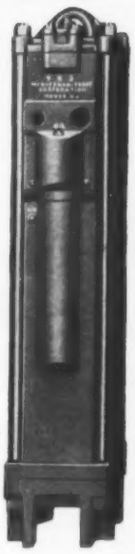

983 Double-Acting Pile Hammer, included in the McKiernan-Terry line of 18 sizes of double-acting and single-acting hammers and double-acting extractors

Working in Soil and Mud

Soil Composition

Class	Per Cent		
	Sand	Silt	Clay
Sand	80-100	0-20	0-20
Sandy Loam	50-80	0-50	0-20
Loam	30-50	30-50	0-20
Silt Loam	0-50	50-100	0-20
Sandy Clay Loam	50-80	0-30	20-30
Clay Loam	20-50	20-50	20-30
Silty Clay Loam	0-30	50-80	20-30
Sandy Clay	55-70	0-15	30-45
Silty Clay	0-15	55-70	30-45
Clay	0-55	0-55	30-100

Material to be excavated can be roughly divided into three classes: rock, hard digging, and easy digging. Rock is anything that requires blasting for efficient digging by most machines. Hard digging is compacted, cemented, or rocky dirt; medium clay; soft shale; rotten rock, and other material which can be dug by heavy machinery or loosened by rippers. Easy to medium digging is any soft or fine loose deposit.

Soil is composed of particles of various sizes and chemical composition. It can be analyzed as to sizes by sifting a dried and weighed sample through a set of testing sieves and weighing the material retained on each screen. If further analysis is required for particles passing the smallest (200 mesh) sieve, it is done by hydrometer. This process is based on the fact that the speed of settlement of such particles is proportional to their size.

Fine grained soils are known as heavy, and sandy ones as light. Heavy soils may or may not permit circulation of ground water, light ones almost always do. Heavy soils are more readily softened by water. They are often called plastic soils, even when not in a plastic condition.

Resistance

The resistance which must be overcome to dig a formation will be made up largely of hardness, coarseness, friction, adhesion, cohesion, and weight. In digging, hardness is resistance to penetration. It is increased by close packing of soil or filling of voids with finer particles, lime, or other natural cements. Clay soils are hard when dry and soft when wet.

Cobbles, boulders, or hard lumps increase the power requirement for penetration. They are most troublesome when they are oversize for the machine, or packed so firmly in place that they cannot slide or rotate away from the cutting edge.

As the digging edge penetrates, friction absorbs an increasing proportion of its force. It is affected by particle size and hardness, by the amount of moisture, and the presence or absence of natural lubricants such as humus or soft clay. Adhesion is the sticking of soil to the digging parts. It may increase the friction load substantially in wet work.

Cohesion is resistance to tearing apart. Firm or hard materials may split readily along bedding or cleavage planes so that they can be dug rather easily from the proper direction. Relatively soft clay banks may be very difficult to dig because of strong and uniform cohesion. A tough formation lacking planes of weakness is described as "tight".

Most excavated material is transported in trucks or scrapers partly on pit floors or unpaved haul roads. The weight that can be carried, and the speed made by any given unit, are affected by the resistance of the surface to the wheels or tracks.

Tractive efficiency can be increased by the use of wider or longer tracks, or larger or more numerous tires. With any degree of tractive efficiency, traction or the total amount of driving push can be increased up to a point by increasing the proportion of vehicle weight on the drive wheels.

Capacity

Most buckets and bodies are rated by the manufacturer as to carrying capacity in loose yards. This rating may be water level (the yardage of liquid which could be carried if it didn't leak out); line of plate or struck measure, which is water level or water level plus the space between parts of the rim which project above its low point; or heaped. Shovel dipper buckets and truck bodies are normally rated at water level, carrying scrapers at both struck and heaped measure, and clamshells at water level, line of plate, and heaped.

An excavator may not be able to fully load its bucket or bowl because of hard digging, poor traction, inadequate power, heavy material, or other factors. A hauling unit may be run

ROAD BUILDING?

Get the jump on competition with this 5½ yard Manitowoc 4500

FAST JOB-TO-JOB MOBILITY
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INDIANA TOLL ROAD — Proof of Manitowoc's mobility and fast, economical erection on the job. Western Contracting Corporation of Sioux City, Iowa, unloaded and erected this 4500 in record time "between trains". Total unloading and erecting time was less than four days. Because of its narrow, low travel clearance and design, unit was shipped on a flat car without having to be completely dismantled. This 5 yard dragline with 140 ft. boom was assigned to excavate more than 200,000 yards of material.

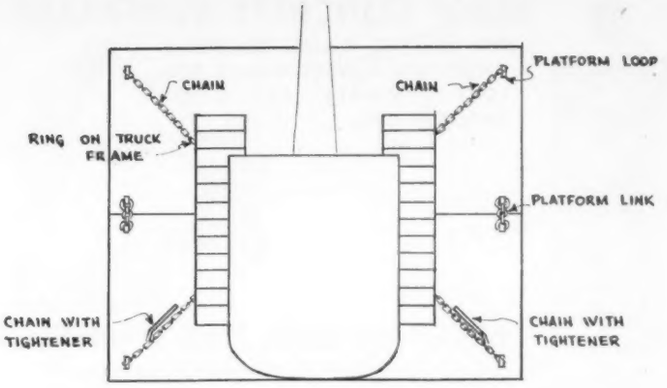
BIG DIGGING CAPACITIES
FAST WORKING CYCLES

WEST VIRGINIA TURNPIKE — Latrobe Construction Co.'s 4500 Manitowoc shovel with 5½ yd. bucket moved 550,000 yards of rock in a 4-month period — averaging 6000 yards per eight-hour day, with performance reaching a maximum of 778 yards per hour in "well shot" rock.

More and more successful road building contractors across the country are making the Manitowoc 4500 the "big tool" on their big jobs. When you have big yardage to move — move it fast with a giant Manitowoc 4500. Only the "4500" has the perfect combination of big machine capacity and the mobility and fast, simple portability of small machines. It can be easily trailored from job-to-job or transported by flat car. On the job it can be erected in a matter of several days and is easily maneuvered from one location to another without trailing a cable. Handles big rock without picking or scratching. With one 4500 instead of several small machines, you cut down on the number of operators and oilers on the job. Get the edge on competition — give yourself a "break" on your next bid — figure on a Manitowoc 4500. Write Manitowoc Engineering Corp., Manitowoc, Wisconsin.

MANITOWOC
SHOVELS 1-5 YD. Speed Crane CRANES 20-100 TON

This is the second in a series of articles consisting of excerpts from the new book "Moving the Earth", by Herbert L. Nichols, Jr., published in March by North Castle Books, Greenwich, Conn. Priced at $15, the book is available through the Book Order Department of CONTRACTORS AND ENGINEERS, 470 Fourth Ave., New York 16, N. Y. A copy may be ordered on approval by circling No. 1 on the Request Card at page 18. Copies will be billed at $15 plus postage.



Chaining a shovel to a platform for work in extremely muddy conditions. ►

partly empty to save strain on rough ground or to enable it to climb steep grades.

The work cycle may be timed as a whole in figuring output for existing conditions. For accuracy it is necessary to take the average of a large number of passes, as there may be a considerable variation among them.

A study of bulldozer or scraper operation may include some or all of the divisions in the following list. Each one should be timed. Digging and traveling distances should be measured. A record should be made of all grades, as these machines are much less efficient going uphill than down.

Steps in a bulldozer's operating cycle, in sequence, include digging, shifting into second, transporting, dumping, shifting to reverse (raising blade), returning, shifting to low (lowering blade). For a scraper, they include loading, shifting, transporting, shifting, spreading, shifting, deadheading to turn, turning, returning to digging area, deadheading to turn, turning, getting to loading position, shifting into low, and waiting for pusher.

Mud as a Work Surface

Mud is an impediment to work in many ways. Deep mud causes equipment to bog down and to become useless until pulled out, and a film of mud may render firm footing dangerously slippery. Mud sticks to shovel buckets and truck bodies instead of dumping, and builds up in chains and tracks until they jam. It holds objects lying on it by powerful suction so that they become difficult or impossible to lift. When frozen it can lock together and immobilize the most powerful machines. And it is much heavier than the same amount of dry soil.

Mud trouble can be reduced by using proper equipment. In general, crawlers are preferable to wheels; tracks should be the longest and widest obtainable; tires should be big, soft, and cleated; and units should be the smallest that will do the work. All-wheel drive is desirable for trucks.

Some wheel tractors can be fitted with temporary metal and rubber tracks which enable them to work in fairly soft places. Crawlers may have oak planks or four-by-fours bolted to their pads so as to project several feet on the outside. These will stand up well if kept on soft ground, and give excellent flotation. They cannot be used with a dozer that has outside push arms.

Wheeled equipment is best kept out of swamps unless they are frozen, dried out artificially or by drought, or have roads built into them. Logs, planks, railroad ties, or even stones may be used to build work roads

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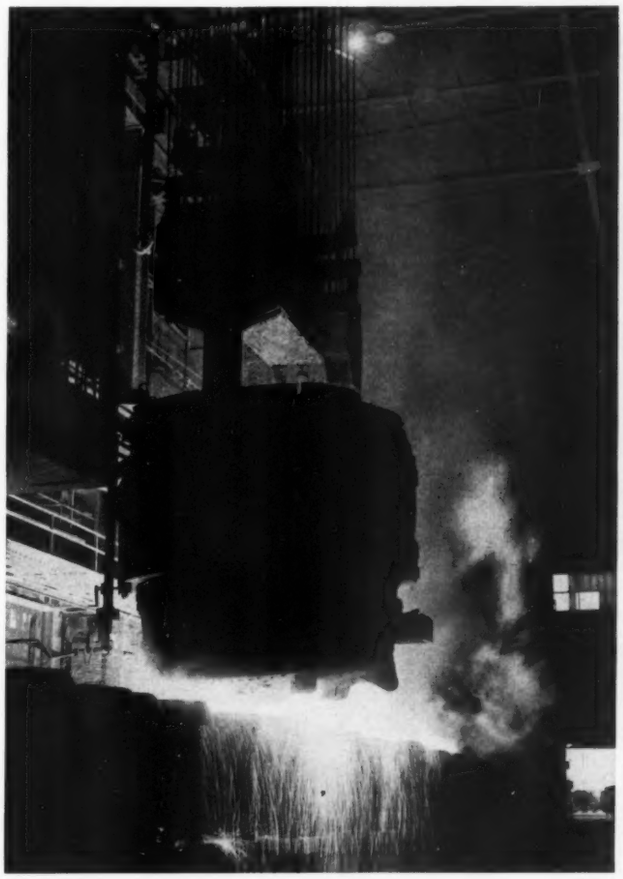

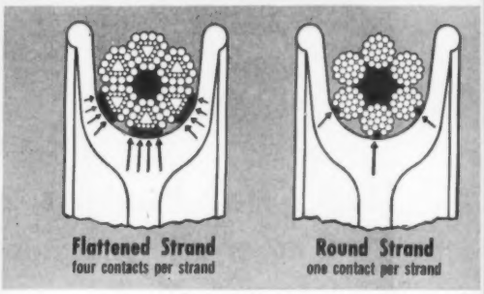

How to handle the tough jobs with Hercules Flattened Strand wire rope

When you think you need a super-rope, check Hercules Flattened Strand. This is the wire rope that packs in 10% more steel than round strand rope, making it 10% stronger and safer. It wears longer and more evenly—reduces sheave wear, too.

The 10% extra strength over round strand rope is sometimes the difference between the possible and the impossible. Hercules Flattened Strand frequently does the tough jobs which would otherwise require larger size rope—and without the bother and expense of changing sheaves and drums. The extra strength is useful, too, when shock loading is involved. Saves rope and money.

If you think that Hercules Flattened Strand wire rope may solve a problem, talk it over first with your Leschen man. He can be reached through your nearby Leschen distributor. His advice is based on the best possible authority—Leschen's long experience and engineering research—the longest in the industry. And with Leschen wire rope you are assured of higher-than-rated quality and longer-than-expected service.

If you can use Hercules Flattened Strand rope you'll be money ahead. See about it soon.

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HERCULES *Red-Strand*® WIRE ROPE

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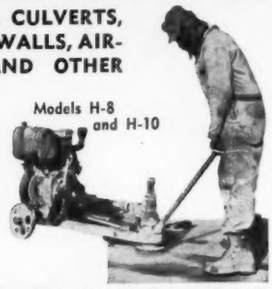

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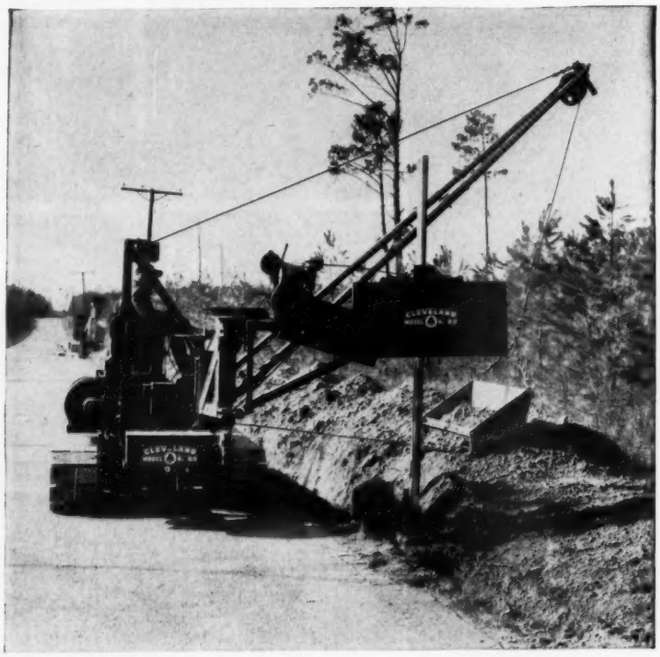

Saves 6 men, 4 tampers, 2 compressors and small dozer with one-man-operated "80-W"

VAN DOREN BROTHERS of Richmond, Virginia recently backfilled and compacted approximately two miles of trench, 2 feet wide and 4 feet deep, for a 6-inch gas line with just one man and one machine, a Cleveland "80-W" backfiller.

Before the Van Dorens purchased their "80-W" they used 7 men, a rubber-tired dozer, 2 compressors and 4 air-driven tampers for backfilling and compacting on jobs of similar size and type. The one-man-operated "80-W" did the complete job in less time than the 7-man crew formerly required on comparable jobs. "It's a great time saver," was F. M. Van Doren's comment on its performance.

On a previous job their Cleveland backfiller had saved them considerable time and money on a 12-inch water line trench, averaging approximately 6 feet deep, by its unique ability to backfill spoil deposited on a down slope on the far side of the trench, while simultaneously tamping it to the state of Virginia's rigid compaction specifications.

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CLEVELAND

(Continued from preceding page)

through swamps.

A revolving shovel can work on very soft ground when supported by a set of platforms. They usually consist of wood platforms on which the shovel can stand, provided with side rings or loops or cross cables, by means of which they can be picked up by a chain across the shovel bucket, or directly by the bucket teeth.

Techniques of working from platforms vary with the type of shovel attachment being used. A dragline ordinarily stands at the back of a line of platforms and digs at the rear or sides. When its work from one position is finished, it walks ahead one or more platform widths, then picks up the platforms behind it and swings and places them in the front, repeating this process as often as a move is required.

A pull shovel is used in the same manner. It is not as well suited to mud work because of its shorter digging radius, and particularly because of its inability to pile the spoil well back, but it shares the dragline's advantages of walking away from its work and sliding the bucket to break suction. A pull shovel is usually able to pick up platforms by means of a cross cable caught by the bucket teeth.

A clamshell has almost as much reach as a dragline, and can work without dragging debris such as roots, stumps, and boulders up against the platforms and itself. However it has the handicap of pulling the bucket straight up, which in sticky mud requires overcoming suction more resistant than the weight of the bucket and load. Digging is best done off the rear or sides of the platforms, but the ground ahead can be graded before placing the platforms.

Dipper sticks are seldom seen in swamps. They can do shallow digging and uprooting of stumps behind and at the sides of the platforms, but any serious digging must be done at the front and even this operation is limited to fairly narrow ditching in firm mud. The spoil must be dumped far enough to the side so that platforms can be placed across the ditch. Even with extra wide platforms, the weight is liable to cause the sides of the ditch to cave or fall in, and the footing for the platforms is not secure.

Wet Digging

In any extensive wet digging, draining or surface pumping is liable to leave a sheet of at least a few inches of water on the bottom. This is a convenience in establishing a flat bottom grade, but unless special precautions are taken, large quantities of water will be dug out along with the soil.

Most excavating in swamps and mud is done by revolving shovels with dragline attachments. However, when the dug material is to be moved a great distance, or the amount is very large, cable excavators may be used. Since they can be anchored on one side of the swamp and operated from the other, they eliminate many of the difficulties and dangers of swamp digging. However, the work involved in setting them up and moving them, and the need for other equipment to remove the spoil from the tower foot, discourages their use except for large or long-term operations, or where the digging cannot be done by any other available equipment.

Bulldozers are not suited to mud excavation since they cannot work efficiently on artificial supports. They can skim shallow layers of mud off hardpan and dig cautiously in muds compact enough to give them some traction. Wide-gage dozers are preferred, as they usually have wider track shoes for greater flotation, their weight is spread over a larger area, and they turn more readily on poor footing.

If mud is too deep for available draglines to handle, or if it slumps into the excavation before fill can be placed, or if there is no adequate equipment to keep the water out, blasting may be employed. Mud is easily blasted out of a limited area and spreads in a thin film over the landscape, leaving no heaps to dispose

When you see genuine Crosby Clips on the job, you know that safety is foremost. Safety-conscious contractors insist on drop-forged, hot-dip galvanized Crosby Clips. Available in *all* sizes at distributors everywhere.

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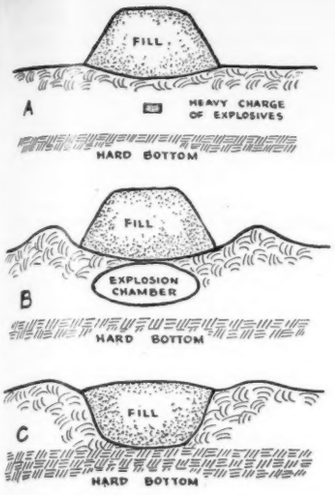

Bottom shooting in mud.

of. There are three principal techniques. One is to blast a ditch along the right-of-way, then dump-fill it in. Another is to build the road or section of it on top of the swamp, and blast the muck from under it. The third, called toe-shooting, consists of making a big heap of fill and blasting the mud ahead and to the sides from under that.

Muck can be stabilized if enough water can be squeezed out of it to convert it from a semiliquid to a solid. Vertical sand drains may be used to dry up the mud so that it will support a load. They consist of columns of sand extending from hard bottom to the top of the mud, and connected at the top to each other and, by a sheet of sand or gravel, to an outlet.

Dewatering with pumps is, of course, an alternative, but this method of stabilization is relatively costly.

Stuck Machinery

The easiest and most attractive method to rescue machinery that has become stuck in mud is to stretch a chain or cable to some power source and pull it out. Often there is no such power, but if there is, it should be used with caution. If the stuck machine has not sunk but has simply lost traction on a slippery surface, power can usually be applied without damage. However, if the unit is firmly lodged, use of moderate power may be useless, and too much power may pull it apart.

Dump trucks are probably the most frequently stuck type of equipment. If one is loaded, it may be possible and desirable to dump the load, after which the truck may pull out under its own power. A shovel is a highly effective rescuer of bogged trucks. A dipper bucket may be placed under the rear of the frame (or, with some risk of damage, under the rear of the body) to lift and push at the same time. Other shovel attachments may have the bucket chained to the truck to lift or drag it, or the shovel may be used as a tractor for a horizontal pull. If a truck cannot be dumped, or has been dumped and is still stuck, and no power shovel is at hand, it may be necessary to dig out the wheels in the direction toward which it is hoped the vehicle will move.

The most generally effective device for extricating bogged machinery is a winch. It may be mounted on and powered by a tractor of a truck, or it may be a portable unit. A bulldozer-equipped tractor can get behind the stuck machine to lift and shove as the winch pulls, but a man should be stationed to put poles in front of the pushing rig as it moves so that it does not get stuck in the hole left by the truck.

Crawler tractors do not bog down as readily as wheeled ones, but can do an even more thorough job of it. If outside power is available, the machine may be pulled out by a line attached to its drawbar, front pull hook, or other hold.

Shovels on tracks may require

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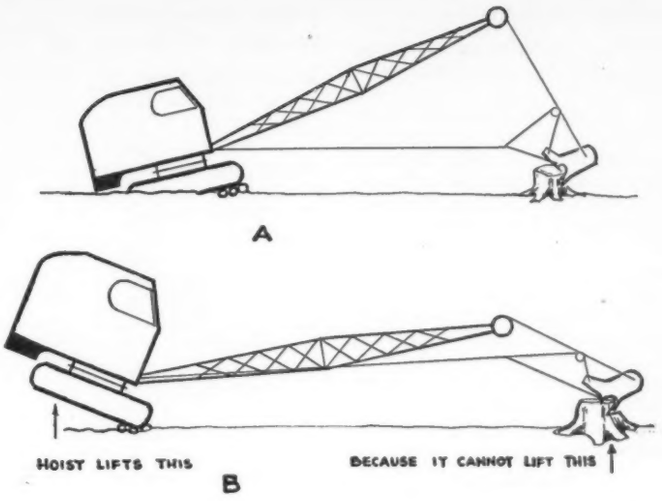

Extricating a stuck shovel by its anchored bucket. ►

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(Continued from preceding page)

trenching around the rig and extensive shoring if they are stuck fast in mud.

If a shovel is overturned or so steeply tipped that it cannot be operated, the swing lock should be set, a line should be attached to the top of the A-frame and to any available anchor on the high side, and drawn taut to prevent further settling. If this line can be attached to a power source of sufficient strength, the shovel may be pulled upright, but this should be done slowly with careful attention to any tendency toward bending the A-frame or other parts. If a shovel starts to tip during a swing, the bucket and load should be dropped if possible.

Freezing Down

Mud may cause serious difficulty when it freezes, as it sets like concrete and anything in it is likely to stay there. Crawler machines are particularly vulnerable, for if they are muddy, the tracks, track wheels, and chassis are liable to be combined into one immovable unit. Precautions to be taken are to clean all mud from the tracks and wheels at the end of the shift, and to park the machine on rock, metal or wood, with as much of the track length as possible in the air.

If the tracks are frozen down, but the track wheels are free, the machine can often be broken loose by rocking it forward and backward with clutch and gears. A blowtorch, the larger the better, is the usual tool for melting out. Hot water is effective if available in large quantities.

A weakness of tracked vehicles is the possibility of going off the track. When this happens, it may mean that the track is in a heap alongside the machine, with the track wheels resting on the ground. More often it means that the track rails are not engaging the wheel flanges properly, being displaced to either side.

The principle involved in getting a track back on a bull wheel or idler is similar to that of installing a tight fan belt on a car. If any one of several methods of rolling the machine forward or lifting it up does not serve to restore the track, the track adjustment should be loosened and the track "broken" by removing a lock and driving out one of the hinge pins.

(To be continued next month)

Folder on Tractor-Mounted Earth-Boring Machine

■ A tractor-mounted earth-boring machine that digs in clay, hardpan, shale, or frozen ground, and sets a pole, is illustrated in literature available on request. The Highway Model HD machine is designed to dig holes 9 to 20 inches in diameter to a depth of 7 to 10 feet.

The earth-boring unit consists of a double train of gears, controlled by two multiple-disk clutches and brakes. One train of gears rotates the auger by power, and the other furnishes the power to feed the auger into the ground.

A 2,500-pound-capacity winch and a pole derrick to handle 40 to 45-foot poles can be furnished as optional equipment.

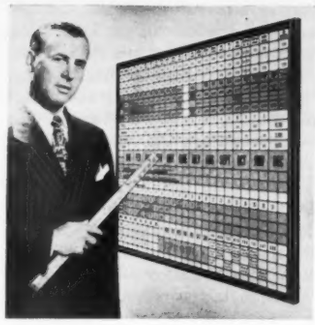
To obtain this literature write to Highway Trailer Co., Edgerton, Wis., or use the Request Card at page 18. Circle No. 880.

Visual System Shows Progress of Operations

■ The visual control system made by Graphic Systems, 55 W. 42nd St., New York 36, N. Y., is now available for a wider range of applications. Boards may now be ordered either larger or smaller than the standard 38½ × 24-inch size.

The Boardmaster visual control board can be set up to present a picture of any given operation in any step-by-step or period-by-period sequence. Along with checking the progress of operations, the system simplifies scheduling procedures and keeps materials inventories on construction jobs.

The aluminum visual control board can be displayed on the wall, propped up on a desk, or attached to a swinging wall panel designed to mount multiple units. For larger operations, any number of board may be hung adjacent to each other on the wall.



The Boardmaster visual control system.

Small grooves stamped through the metal surface of the board hold posting cards on which the pertinent information is typed or written. When posted, the cards form horizontal and vertical columns. The cards come in 4 sizes and in 6 contrasting colors.

For further information write to the company, or use the Request Card at page 18. Circle No. 932.

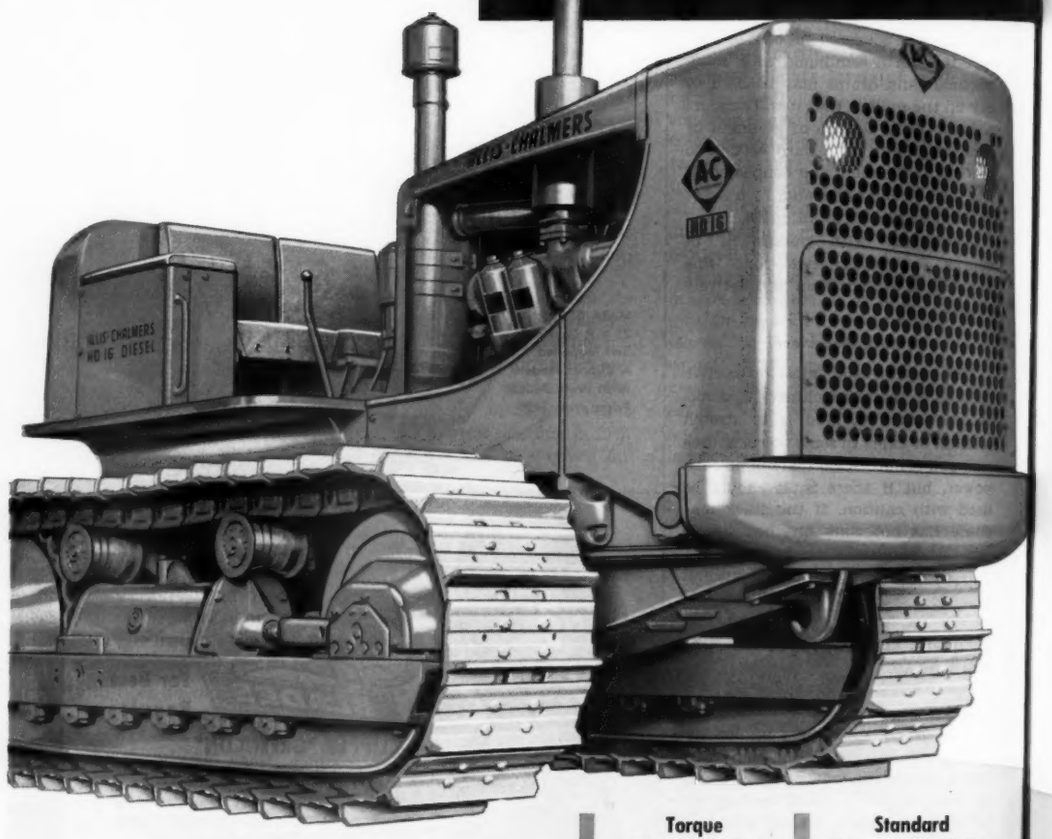
New Four-Cylinder Engine

■ Complete specifications on a new four-cylinder industrial engine are contained in a folder from Aerojet-General Corp., 2530 Spring Grove Ave., Cincinnati 14, Ohio. The Aerojet gasoline engine with a 7 to 1 compression ratio delivers 25.5 horsepower.

The engine is 28⅜ inches long and weighs only 101.1 pounds.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 915.

Allis-Chalmers presents the NEW HD-16



Your choice of two outstanding drives

	Torque Converter Drive	Standard Transmission Drive
Horsepower	150 net engine hp	131 belt hp
Weight	31,600 lb	31,500 lb
Drawbar pull	up to 60,000 lb	up to 35,945 lb

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

New Truck Line Offers Shorter Wheelbases and Wide Power Train Choice

■ The 1955 Chevrolet line of trucks includes 75 models on 15 wheelbases in the light, medium, and heavy-duty field. To power these units, Chevrolet is offering a choice of five new 6-cylinder valve-in-head engines with 235 and 261-cubic-inch displacement. The company is also introducing a new V8 engine that delivers 145 horsepower.

Six choices of transmissions are available in the various series. These include three and four-speed Synchro-mesh, the Hydramatic, and Powerglide.

Designed on the basis of an extensive survey of truck users and drivers, most models have a shorter wheelbase, some as much as 8 inches shorter than previous units. A second trend in the new models is the introduction of wider panel bodies to provide a larger load space for handling bulk loads.

Roomier cabs, increased visibility, and shorter wheelbases are features of the Chevrolet 1955 truck line. Here is the Series 5100 model.

The line offers two pickups in the light-duty series, one featuring a 78-inch-long pickup box and the other a 90-inch length. A distinctive low pickup carrier, the Cameo-Carrier, makes pioneering use of reinforced glass-fiber panels.

New Chevrolet trucks also feature a reduction in maximum cab heights, up to 7 inches on the new Low-Cab-Forward models. Cabs are roomier and have an improved ventilation system. An increased window area gives up to 36 per cent more visibility than before. Cab steps are enclosed for protection against mud, ice, and snow.

The new trucks also have wider front treads, straight frame sidemembers, and improved suspensions for better road stability.

Tubeless tires, new to the truck industry, are offered as standard equipment for the light-duty models.

The Low-Cab-Forward models have the new V8 engine as standard equipment. Three models are now offered as forward control units, including one mounted on a short wheelbase of 104 inches. This truck contrasts to the longest 1955 Chevrolet chassis which is built on a 220-inch wheelbase. As with other models in the heavy-duty line, this unit now has a higher gross-vehicle-weight rating of 18,000 pounds.

All truck chassis are equipped with a new 12-volt electrical system. Power steering and power brakes are now available on all models.

For further information write to Chevrolet Motor Division, General Motors Corp., A-227 General Motors Bldg., Detroit 2, Mich., or use the Request Card at page 18. Circle No. 833.

NEW STANDARDS OF PERFORMANCE

for a wide range of heavy-duty work

Set your sights on an HD-16! This big new tractor not only brings you *more* power for bigger jobs . . . it makes more effective use of horsepower, with a brand new Allis-Chalmers diesel engine and your choice of two new drives — the job-proved torque converter or the easy-shift standard transmission. Either way, the HD-16 brings you a new high in tractor-operator efficiency . . . a new high in work done under even the toughest conditions.

NEW STANDARDS OF DEPENDABILITY AND LONG LIFE

under *all* conditions!

The HD-16 follows the Allis-Chalmers *advanced basic design*, with such important features as its all-steel, Box-A main frame and one-piece steering clutch and final drive case . . . straddle-mounted final-drive gears with tapered roller bearings . . . unit construction . . . simplified lubrication and service designed with *better* maintenance in mind. What's more, it is newly engineered throughout to provide big safety factors in all components . . . plus outstanding new features like the new Allis-Chalmers heavy-duty diesel engine, new "wrap-around" radiator guard, husky new transmissions, new true-dimension track, and many others.

All in all, the new Allis-Chalmers HD-16 brings you an outstanding combination of performance and long life with both mounted and drawn equipment . . . a higher rate of production, more working time, more work done, LOWERED JOB COSTS. You OWE it to yourself to get all the facts now from your nearby Allis-Chalmers dealer.

Portable Lighting Unit Is Trailer-Mounted

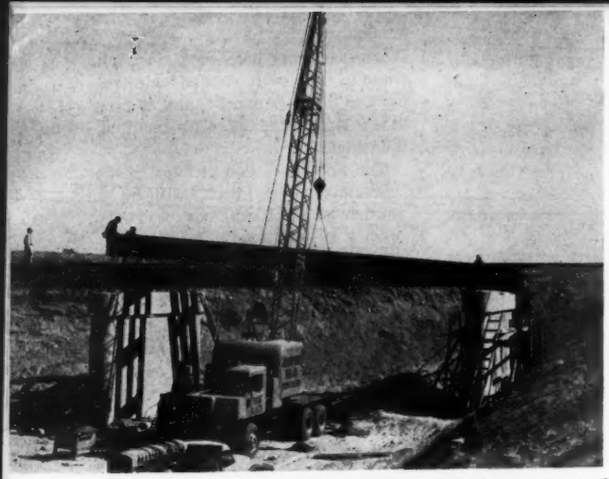
■ A trailer-mounted lighting unit designed for use in construction work has been announced by United States Motors Corp., 131 Nebraska St., Oshkosh, Wis. The unit includes a 10 kw engine-generator and a series of six 1,500-watt lights.

The new U. S. Motors lighting unit.

The lights swivel and adjust vertically to supply broad illumination. The panel board is equipped for the individual control of the lights and also provides receptacle outlets for the operation of power tools.

The lights may be removed and spotted in a variety of positions and distances around the generator.

For further information write to the company, or use the Request Card at page 18. Circle No. 837.



A Lorain Moto-Crane handles one of the heavy structural steel members for the 169-foot-long Pantano underpass structure. Only half of it will be used by the present road.

Difficulties are overcome on small bridge contract

Problems encountered in building small bridges can be just as tough as those on longer spans, as one Arizona contractor found out in building three structures for a 7.87-mile relocation job on U. S. 80. The road-straightening job called for two small bridges to be built, along with a reinforced-concrete underpass. The main westbound line of the Southern Pacific railroad tracks crosses the highway on this structure.

Though small, the job was complicated by ground-water conditions at the Davidson Canyon bridge site, the need for extra protection for the substructure of the Cienega Creek bridge, and the necessity for placing especially heavy structural steel for the underpass.

Going to work on the $125,000 contract for the Arizona State Highway Department, San Xavier Rock & Sand Co., Tucson, Ariz., ran into the ground-water problem at the Davidson Canyon bridge site immediately. The canyon is fed by a nearby spring, and, to complicate work, unseasonal rains and a flash flood had thoroughly saturated the sand in the bed of the wash before work started.

This bridge, the westernmost of the three structures on the job, is a 310-foot-long structural steel span on reinforced-concrete footings, abutments, and stub piers. The 80, 150, and 80-foot spans, calling for 810,000 pounds of steel H-beam bearing piles, 452,000 pounds of structural steel, and 603 cubic yards of Class A concrete, has a reinforced-concrete deck set atop I-beam girder members.

Once substructure work had started, the contractor found it desirable to move one of the bridge piers slightly. This sent the footing to bedrock 7 feet lower than at the original location, and into water. A 72-hour pump run with a 6-inch centrifugal pump working full force failed to remedy the situation, and the contractor finally had to drive a steel pile cofferdam around the piers and dewater inside the cofferdam.

Actually, it was not possible to dry all the footings completely, so excavation was carried down into cemented conglomerate bedrock, reinforcing steel was placed, and the footings were tremie-poured by a Gar-Bro transfer bucket and rubber elephant trunk.

Heavy Steel for Underpass

Problems on the relocation job were not limited to the Davidson Canyon structure. At Pantano underpass, heavy structural steel which would support rail traffic had to be set. The 6-foot girders for this structure meant that 28-ton lifts had to be made with 30-ton truck cranes—equipment which is not always readily available to a smaller contractor.

The heavy girder steel included eight members covering four spans. These spans measured 32 feet 1½ inches, 49 feet 6⅞ inches, 49 feet 6⅞ inches, and 32 feet 1½ inches.

The deck of the underpass also posed some problems for the contractor and the crew, since it represented a new type of work to almost everyone. Plans called for a 5½-inch reinforced-concrete deck, covered by a membrane of tar which had to be

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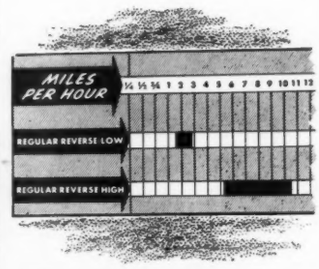
3. TO SUPPLY A HIGH SPEED REVERSE GEAR – – – you can accomplish more work.



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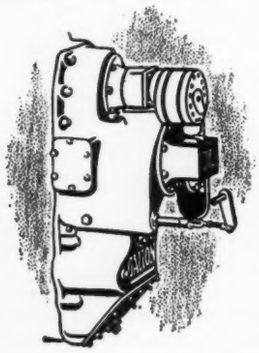

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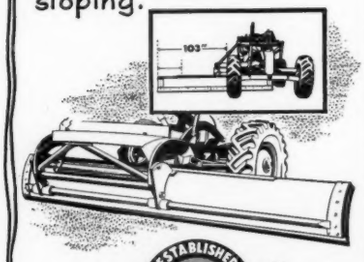

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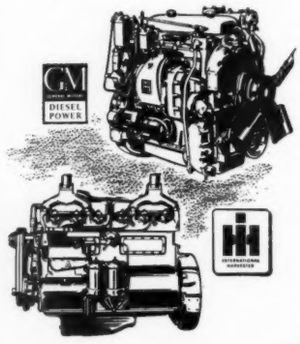
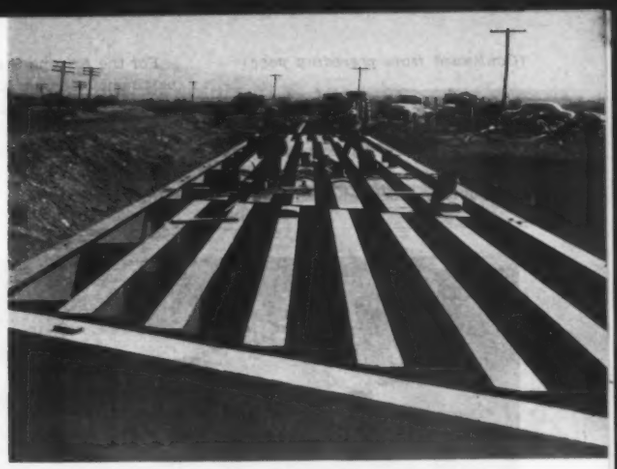


ESTABLISHED GALION 1907

THE GALION IRON WORKS & MFG. COMPANY
GALION, OHIO, U.S.A.
Cable address: GALIONIRON, Galion, Ohio
MANUFACTURERS OF
GALION MOTOR GRADERS

Problems of ground water, handling structural steel, and concrete pours are overcome on three structures



Crews rivet steelwork on the underpass. The completed structure will have a 5½-inch reinforced-concrete deck, covered by a membrane of tar, and topped with 2½ inches of grout.

wiped on, and topped with 2½ inches of cement grout mixed with sand at a ratio of 3 to 1.

Altogether, a total of 56,000 cubic yards of excavation, 298,000 pounds of structural steel, 36,000 pounds of reinforcing steel, and 26 cubic yards of mortar for slab protection were required for the structure. Class D concrete used totaled 99 cubic yards, and Class A concrete, 397 cubic yards.

The underpass is 169 feet long and 21 feet wide—just wide enough for a single railroad track. The present highway will use only the south barrel of the underpass, but there is room left for future widening.

Bridge Protection

Permanent steel cofferdams were placed around the abutments of the Cienega Creek bridge to protect concrete from logs, trees, and other debris carried down the creek by flash floods. This 273-foot-long span also has a 34-foot clear deck of reinforced concrete. Structural steel girders were used for the 60, 74, 74, and 60-foot spans on this bridge. H-piles under the abutments were used for bearing, and Union Metal Monotubes were driven under the river piers to carry loads at those points. Totals on this job included 260 cubic yards of Class D concrete, 218,000 pounds of structural steel, 225 linear feet of H-piles, and 1,305 feet of Union Metal Monotubes.

Concrete Placing

Every possible means was used to reduce expense and speed concrete work on the bridges. All rectangular portions of the bridge piers and footings were formed with Uni-Form panels originally purchased for a Phoenix interchange structure. One of the contractor's most efficient operations was to use a Rex 34-E paver for mixing and placing operations.

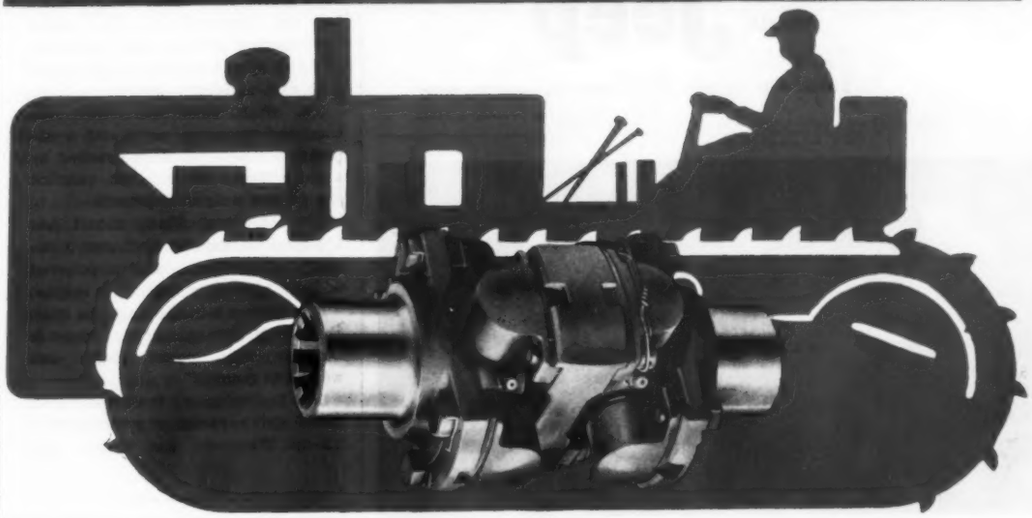
A special bucket made to fit this machine was opened manually, much the same as an ordinary transfer bucket. Dry-batched concrete was trucked to the paver, mixed, and discharged to the bucket mounted on the paver's 32-foot boom. Then the boom was either hoisted or sent out level to place the concrete. At times, the boom had to be raised so high to place the material that it was necessary to use a cable pull from a "Quick-Way" truck-mounted machine. But the method made it possible for the contractor to schedule continuous pours.

The footing concrete for Davidson Canyon bridge was placed from truck mixers hauling from San Xavier's commercial plant in Tucson, 35 miles away. This work was under way as the Pantano underpass and the Cienega Creek bridge were finished. When those structures were completed, the Rex paver moved up to Davidson Canyon to finish the last structure with the concrete-mixing and placing method which had done such an efficient and economical job on the other bridge. Hunt Process Clear was used throughout.

W. H. Barrett was concrete superintendent on the job for San Xavier Rock & Sand Co. Working closely with him at field level were resident

(*Concluded on next page*)

FLEXIBLE



Modern Crawler tractor design requires a F-L-E-X-I-B-L-E connection between the engine and transmission. MECHANICS Close-Coupled Type UNIVERSAL JOINTS not only provide for high angularity within cramped space but compensate for out-of-alignment conditions. The shocks and strains that crawler tractors encounter in heavy duty work often are so great that they temporarily twist the tractor frame. MECHANICS Close-Coupled Type UNIVERSAL JOINTS are designed to provide the F-L-E-X-I-B-I-L-I-T-Y needed to make efficient operation possible under such adverse conditions. MECHANICS exclusive KEY method of driving has the highest safety factor, transmits the most torque, and averts costly breakdowns that result from driving through bolts or screws that work loose. Let our engineers show you how these MECHANICS advantages will benefit your product.

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MECHANICS
Roller Bearing BW
UNIVERSAL JOINTS
For Cars • Trucks • Tractors • Farm Implements • Road Machinery • Aircraft • Tanks • Busses and Industrial Equipment

(Continued from preceding page)

engineer M. C. Livesay and engineering inspector W. H. White. The Southern Pacific representative was Burt Struthers. D. M. Kelley was general superintendent.

For the Arizona State Highway Department, George E. Lang is state highway engineer; C. B. Browning, deputy state highway engineer in charge of construction; and R. A. Hoffman, engineer of bridges and dams. THE END

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You can save the cost of an auxiliary engine and the time lost in loading or towing it by putting a 4-wheel-drive Universal 'Jeep' on the job. With power take-off, the 'Jeep' operates air compressors for pneumatic tools as shown above, electric power generators and other belt-driven equipment. See your nearest Willys dealer or write for information.

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BOTH AC and DC for welding current

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With Lincoln Idealarc, you have a welder that efficiently handles every repair, every hardsurfacing, every construction job in your shop. Whether the job is AC or DC, needs a forceful arc or soft arc, you are assured of top speed, top quality... for the price you would pay for a DC Welder alone. There is no other welder like IDEALARC.

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The World's Largest Manufacturer of Arc Welding Equipment

Core-Drilling Machine Is Highly Portable

■ A new lightweight portable electric core-drilling machine with detachable bits has been developed by Demo Tool Corp., 8735 Melrose Ave., Los Angeles, Calif.

Weighing only 50 pounds, the Demo DL 875S drills self-cleaning holes from ½ to 6 inches in diameter through all materials—including steel-reinforced concrete—without change of bit. Utilizing a rotary cutting action, the tool's carbide-tipped shatterproof bit strikes 8,400 blows per minute while rotating at 350 rpm.

In tests reported, the machine has drilled 1½-inch holes through granite, using water as a lubricant, at the rate of 10 feet per hour. With coupled extensions, the drilling depth is 100 feet. Air is used as a lubricant for drilling short holes, and water is used on deeper holes.

Operated by one or two men on 8-amp 60-cycle (or less) 110-volt current, the Demo drill is powered by a lightweight GEN-A-MATIC Model 17D generator of 1,700-watt power.

For further information write to the company, or use the Request Card that is bound in at page 18. Circle No. 938.

Light Centrifugal Pumps Have Aluminum Bodies

■ Four new models of lightweight self-priming centrifugal pumps have been placed on the market by Barnes Mfg. Co., Mansfield, Ohio. The pumps have suction and discharge openings of 1 to 3 inches. The pumps are made with cast-aluminum bodies.

The SP Jr. model has 1-inch suction and discharge ports and a capacity of 1,500 gph. It is powered by a 1-hp Briggs & Stratton gasoline engine and weighs 45 pounds.

The 55-pound Flash model has 1½-inch suction and discharge, a capacity of 5,000 gph, and is powered by a 1.6-hp Briggs & Stratton engine.

The Barnes 2-inch model, the Star, has a 7,200 gph capacity, a Briggs & Stratton 2-hp power plant, and weighs 65 pounds.

The Lightning, a 3-inch model with 18,000 gph capacity, is powered by a 7.2-hp Wisconsin gas engine, and weighs 130 pounds.

This Barnes centrifugal pump is one of four new models that feature cast aluminum bodies.

For further information write to the company, or use the Request Card at page 18. Circle No. 939.

RUEMELIN Blast Generators

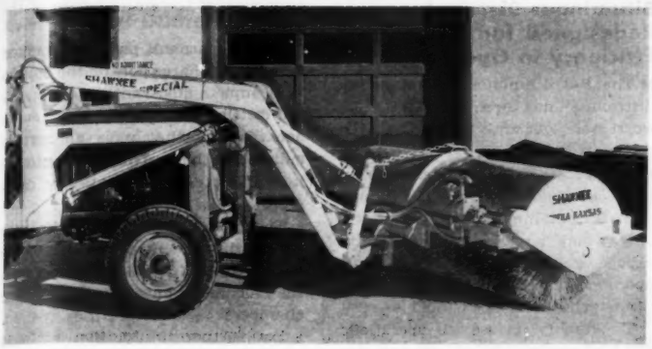
Ideal for Cleaning Bridges Water Towers - Structural Steel

Many contractors use Ruemelin Blast Generators for cleaning steel work to remove rust, paint and scale before repainting. These machines are also used to remove laitance from cement wherever concrete construction is in progress. A wet adapting nozzle can be furnished to convert dry machines to wet type of operation. Built in several sizes.

Write for Bulletin 36-D

RUEMELIN MFG. CO.

MFRS. & ENGRS. • SAND BLAST & DUST COLLECTING EQUIPMENT
3868 NORTH PALMER STREET • MILWAUKEE 12, WISCONSIN, U. S. A.



A power boom has been added to attachments for the Shawnee Special loaders.

Power Broom Offered for Versatile Tractor Loader

■ Recently announced by the Shawnee Mfg. Co., 1947 N. Topeka, Topeka, Kans., is a hydraulically-driven broom for use on the Shawnee Special loader. The new broom is mounted quickly to the frame through three pins. The broom can be angled up to 30 degrees to either side manually.

The 7-foot-wide 24-inch-diameter India palm broom is driven by a hydraulic motor and operates at speeds varying from 150 to 350 revolutions per minute.

Other attachments announced recently for this loader include a bulldozer, an angle-dozer blade, and a 66-inch-wide snow bucket.

For further information write to the company, or use the Request Card at page 18. Circle No. 940.

Simpler End-Section for Corrugated-Metal Pipe

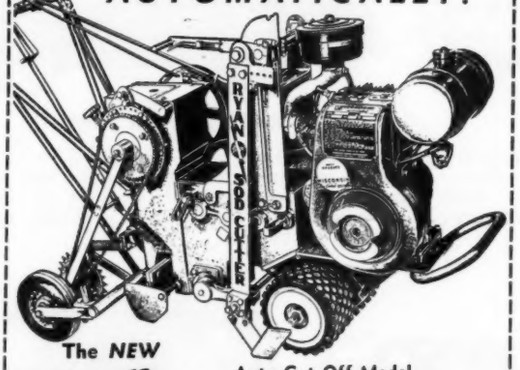
■ A new type of Armco end-section for corrugated-metal structures—a piece using two side lugs and a length of galvanized rod threaded on each end—is reported to offer a saving in both initial and installation costs. The end-section is being marketed as an alternate type of connection for use in 30 and 36-inch-diameter pipe and pipe arches from 18×11 inches to 58×36 inches, inclusive.

For pipe from 12 to 24 inches, the full circumferential rod and lug are recommended. On 42 and 48-inch pipe, and on the two largest pipe arches—65×40 inches and 72×44 inches — end-sections are fabricated with a riveted-on connector section and joined to the culvert barrel with a standard band coupler.

According to Armco, the new type of connection provides ample strength and makes possible a reduced selling price because of material and fabricating savings.

For further information write to Armco Drainage & Metal Products, Inc., Middletown Ohio., or use the Request Card at page 18. Circle No. 820.

measures and cuts sod to exact length
AUTOMATICALLY!



The NEW Ryan Auto-Cut-Off Model
POWER SOD CUTTER
cuts 15 sq. yds. of sod per minute
(and cross cuts in the same operation!)

Here is, beyond doubt, the finest sod cutter ever built. The new Auto-Cut-Off model completely eliminates hand cross-cutting, gives you better quality sod with precision, square-cut ends for easier laying—greater profits. Easily cuts 15 sq. yds. a minute. Available in several sizes. For complete information, write Dept. K-1.

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Quality Built
Division of KM Machine Works, Inc.
871 Edgerton St.
St. Paul 1, Minn.

American Chain & Cable Appoints V. E. Lysaght

Vincent E. Lysaght has been made general sales manager of the American Chain & Cable Co., Inc., Bridgeport, Conn., manufacturer of equipment for the construction industry. Mr. Lysaght was previously divisional manager of the Helicoid, Campbell Machine, and Wilson divisions of the company. He is maintaining his new headquarters in New York City.

4-wheel drive does another job better!

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REMOTE
WORK SITES

Beyond the road's end, where the going is rough and steep, you can depend on the sure-footed 4-wheel-drive pulling power of the Universal 'Jeep' to take you to the job. With a 'Jeep' you can climb steep grades, maneuver through dense woods, drive through loose rock and sand—*and get there!* That's why the 'Jeep' has become essential equipment for engineers, contractors, geologists, miners and lumbermen. See your Willys dealer or write for information.

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Willys Motors, Inc., Toledo 1, Ohio, U. S. A.

NEW METHOD . . .

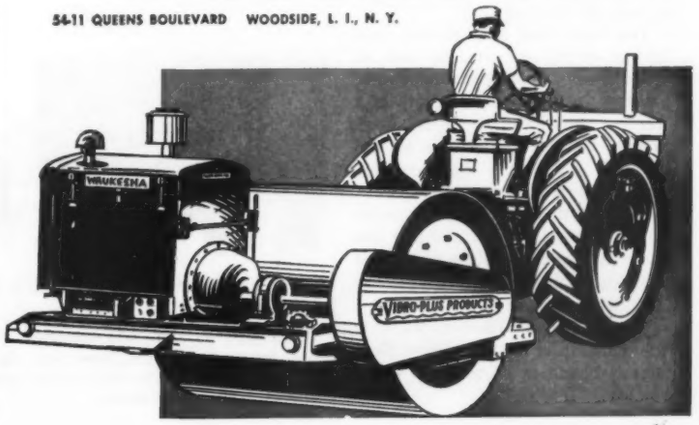
DELIVERS HIGHER COMPACTION IN FEWER PASSES

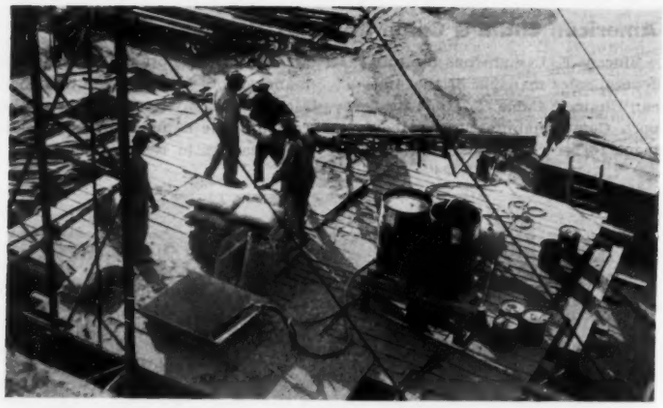
On recent construction jobs *optimum compaction* has been produced to a *depth of 2 feet* after *2 passes* at 2 mph with the new Vibro-Plus Vibratory Roller. Strata substantially deeper than 2 feet have also been compacted with excellent results after 2 to 6 passes.

The Vibro-Plus Vibratory Roller is a self-contained unit of three tons, delivering a seven-ton centrifugal impact which compacts statically and dynamically in all directions. The unit is easily towed by rubber-tired tractors, is vibration and trouble-free, extremely economical and low in initial cost. Reports of special field tests and folder will be sent upon request.

VIBRO-PLUS PRODUCTS, INC.

54-11 QUEENS BOULEVARD WOODSIDE, L. I., N. Y.





This production-line technique set up for making cellular concrete prepares foam in a premix tank and forces it by compressed air into a truck mixer below the platform.

Light Cellular Concrete Produced Efficiently With New Foam Equipment

■ A process for producing cellular concrete with preformed foam has been developed by National Foam System, Inc., West Chester, Pa. The company supplies a pre-mix solution tank, a foam-making nozzle with two lengths of 15-foot connecting hose, and National-Crete foam liquid for making the required foam.

The concrete mix is made in the usual manner. When the cement, water, and the proper aggregate are thoroughly blended, the required amount of preformed foam is added through the nozzle under pressure and mixed. The foam lubricates the wet concrete, which is then easily pumped and poured.

The cellular concrete produced is comparable in strength to standard concretes with similar ingredients, but it is considerably lighter. Its insulating value is said to be many times that of ordinary concrete. But the cost of making the cellular concrete is low, because air is often the main ingredient in the mix.

The material can be precast or poured in place, and reinforced. It can also be sawed, nailed, and drilled.

In a recent installation where foamed cellular concrete was used as poured-in-place insulation on a Sears Roebuck & Co. retail store in Philadelphia, Pa., the contractor, Baton Construction Corp., Philadelphia, was able to set up an efficient production-line technique. As much as 15 yards of cellular concrete were mixed and poured in an hour.

A 5-yard mixer mixed cement and water slurry and received preformed foam produced by the National-Crete foam-making equipment on a raised platform. After thoroughly distributing the foam air cells throughout the slurry, the mixer discharged into a skip bucket in an elevator tower which hoisted the mix to concrete buggies on the roof.

The roof area was divided into 12-foot strips, separated by pipe or strips of wood, into which the foamed concrete was poured to a depth of 3 inches. Alternate sections were poured. As every other section set and could be walked on, the remaining sections could be poured more easily. Because of the lubricating properties of the preformed foam, the mix was easy to pour and handle, and a screed finish is all that was required for a smooth surface.

For further information write to the company, or use the Request Card that is bound in at page 18. Circle No. 846.

Bituminous Distributor Redesigned for Greater Efficiency in Operation

■ The S-J bituminous maintenance distributor has been redesigned to work more efficiently, according to a report from Standard Steel Works, North Kansas City, Mo. The machine is recommended specifically for jobs such as patching and shoulder repair, where larger equipment is too expensive or otherwise impractical to operate. It is often used also on major secondary-road construction.

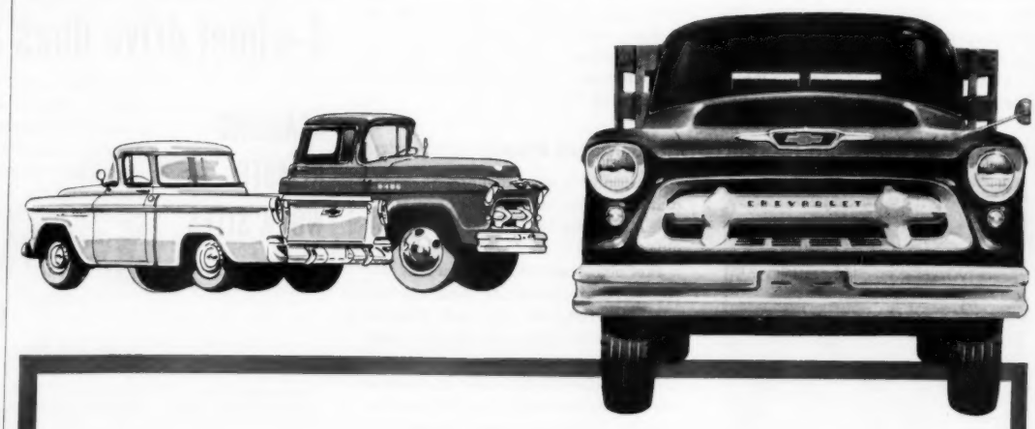
To simplify its use, all operations are now confined to the rear of the unit, eliminating unnecessary trips from front to back. The new design also makes it possible to mount the distributor, with simple modifications, on a truck. In addition, a wide rear platform now gives the operator a clear view of the entire length of the spraybar.

A Viking asphalt pump is mounted with the discharge port on the bottom for complete quick drainage. Like all S-J distributors, this unit has a suck-back feature that pulls all surplus material in the spraybar back into the tank. This eliminates loss by dripping.

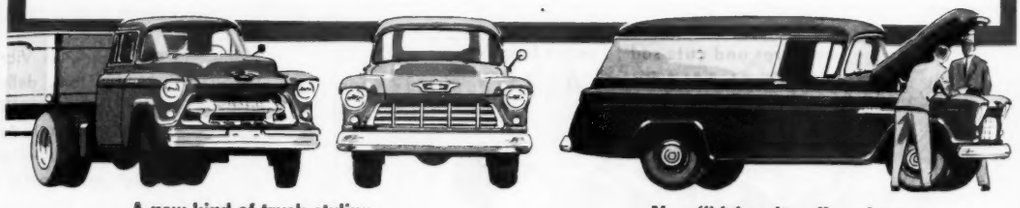
The draw-off valve is on the curb side, and a new manhole cover gives added safety. Standard burners on the machine have easily cleaned chambers.

For further information write to the company, or use the Request Card at page 18. Circle No. 941.

A $5 or $10 food package sent to a Korean orphan will make you feel good too. Send contributions to CARE, 600 1st Ave, New York, N. Y.



NEW CHEVROLET *Task-Force* TRUCKS

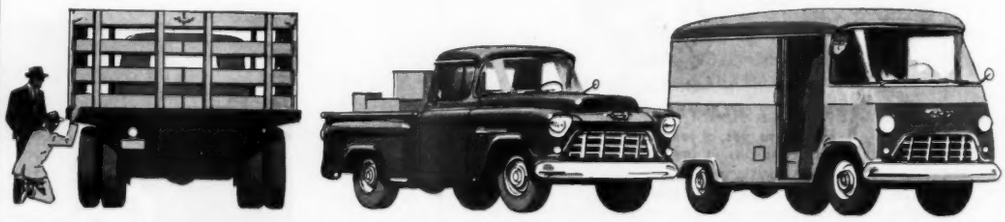


A new kind of truck styling

It's Work-Styling—an exclusive development in truck design with two distinctively different styling treatments. On the job, your truck "looks the part" and becomes a profitable advertisement on wheels for you and your business.

New "high-voltage" engines

Six of them! Each with a modern 12-volt electrical system for surer year-round starts and increased generator capacity—plus a long list of other new advances. They're the last word in smooth, quiet and thrifty truck power.



New frames of standard width

All models now have new ladder-type frames with full-length parallel side members for greater rigidity and longer truck life. Now, too, these newly designed Chevrolet frames are all 34 inches wide to accommodate special body installations.

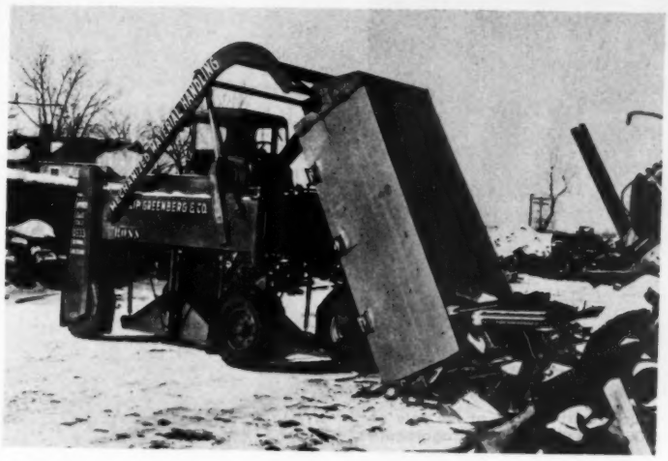
New Overdrive—Truck Hydra-Matic

For even bigger gas savings and less engine wear, new Overdrive is available on all ½-ton models at extra cost. Hydra-Matic, Chevrolet's thrifty automatic truck transmission, is optional on ½-, ¾- and 1-ton models at extra cost.

Straddle Carrier Equipped To Haul and Dump Loads

■ The 20,000-pound-capacity Ross straddle carrier has been equipped with a hydraulically-operated straddle dump device to increase its versatility. The device dumps box-like containers loaded with gravel, sand, scrap, and other bulk materials, which the carrier transports in its normal straddle fashion. Load-lifting capacity is 16,000 pounds.

Made from steel plate and seamless steel tubing, the dump device is U-shaped, and the crossbar of the U acts as the lifting member. The arms of the device are raised by two hydraulic chain hoists to a maximum of $11\frac{1}{2}$ feet. Load-boxes to be dumped must be equipped with curved fingers projecting from one end to catch the lift bar, tilting the container forward. These containers may be obtained from the Clark Equipment Co., although the straddle dump device will work with any containers similarly equipped.



The Ross straddle carrier, made by Clark Equipment Co., has been equipped with a dumping device.

At the dumping site, the operator deposits the box, backs off, lowers the lifting arm to engage the fingers on the box, and then raises the lifting arm until the contents of the box have been emptied. All controls are actuated from the driver's position.

For further information write to Ross Carrier Division, Clark Equipment Co., Benton Harbor, Mich., or use the Request Card at page 18. Circle No. 828.

Coatings Give Protection Against Metal Corrosion

■ A folder describing methods of protecting such metal structures as large-diameter water pipe and fuel-storage tanks from corrosion is available on request. The literature describes the application of protective coatings, together with the cathodic protection system.

The booklet is from the Chemical Fire & Rust Proofing Corp., 11-33 31st Drive, Long Island City 6, N. Y. This company will recommend the proper rust preventive system for specific structures. It maintains a field service for applying the coatings, and it also distributes protective coatings which the customer's personnel may apply.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 860.

Portable Welder Operates Over Wide Heat Range

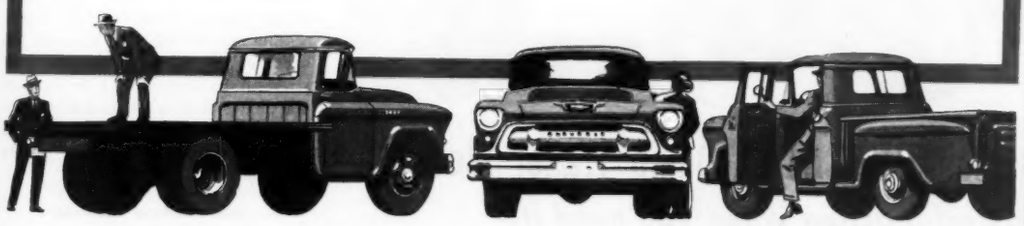
■ A new electric-motor-driven dc arc welder with a wide welding range of 5 to 300 amp has been announced by Hobart Bros. Co., Hobart Square, Troy, Ohio. The unit has a normal rating of 200 amp for average welding work and the added ability to get down to exceptionally low heats for best results in welding light-gage metals.

Model MBT-204 has a special resistance unit connected in the lowest range setting of the main selector switch to make possible the very low welding heat. This unit is mounted under a special hood on the back of the control cabinet thus allowing effective dissipation of its functional heat outside the welder. Satisfactory welding is possible with currents as low as 5 amp.

For further information write to the company, or use the Request Card at page 18. Circle No. 942.

The Model MBT-204 Hobart welder operates at a normal rating of 200 amp for average welding, but can also work at very low heats.

CHEVROLET *They're setting the pace for the whole industry! Take a good look at them here... in the showroom . . . on the road. It won't take you long to discover that these are the most modern trucks on any job.*



New 18,000-lb. G.V.W. capacity

The highest ever for Chevrolet! And that's good news for everyone with heavy hauling to do. For with this hefty hike to 18,000 pounds Gross Vehicle Weight, Chevrolet brings its famous economy and dependability to new heavy-duty fields.

A cab as new as the view

New Sweep-Sight windshield—plus more glass all around—for a wider, safer view. New High-Level ventilation for greater driver comfort. New softer seats. New, more durable cab construction. New concealed Safety Steps that stay clear in all weather.

Power Brakes standard on 2-ton models

This great power helper increases driving safety . . . reduces driver effort. You stop with up to one-third less pedal pressure—and you do it right now! Chevrolet Power Brakes are standard equipment on 2-ton models —optional at extra cost on all others.

There's more to tell, a lot more

Stop in and let your Chevrolet dealer give you the complete "all-new" story. There are many more good things to discover about the New Chevrolet Task-Force Trucks! . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

This Universal 880 Junior Gravelmaster produces crushed rock at the rate of 175 tons per hour. Here a conveyor loads a Dodge 2-ton truck with aggregate for the haul to the work site. *Ray Day Photos*

Old highway restored at low cost by road-mix process

The peculiar behavior of mineral aggregate being used in asphalt road-mix work provided interest—not to mention a challenge to the contractor—on a recent low-cost reconstruction project involving 9½ miles of bituminous highway in northeast Wyoming. The road-mix filler material, an aggregate with a high PI, stubbornly refused to combine with the asphalt under certain conditions.

Matheson Construction Co., Sheridan, Wyo., had the $83,000 Wyoming State Highway Department contract for this job, located on State Route 387 between Pine Tree and Reno Junction. A heavily traveled cutoff between two principal north-south highways, Route 387 has a 22-foot-wide roadway originally built by the road-mix method. In late years the old mat had begun to fail, resulting in high maintenance costs. The stretch thus was scheduled for reconstruction during the 1954 season.

The job included ripping up of all the old bituminous pavement, strengthening of the subbase course by the addition of gravel, reprocessing of the old bituminous mat to blend with the added gravel, and construction of a new road-mix pavement 22 feet wide and 1½ inches thick. An RC sealcoat for waterproofing also was included.

Located at high altitude, the job location was vulnerable to early cold weather. The contractor spent most of the summer removing and reprocessing the old mat and bringing the subbase up to new standards of strength. By September 1, he was just starting to process his road-mix pavement. But good weather held out, and he was able to complete the job by the middle of October.

Trial-and-Error Methods

Matheson had handled asphalt sealing and rock-crushing jobs in the past, but this was his first major highway job calling for asphalt pavement of any type and the manipulation of material. It was necessary for him to work out, in cooperation with Wyoming State Highway Department engineers, some approved method

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HERCULES "Unitized" Dump Trailers

- *4 Wheeler Dump Trailer "Pups"*
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Ask your local Truck Dealer or Hercules Dump Trailer Distributor about the units to fit *your job* . . . or write the Factory direct for specifications and recommendations.

HERCULES 1905 1955 50th ANNIVERSARY

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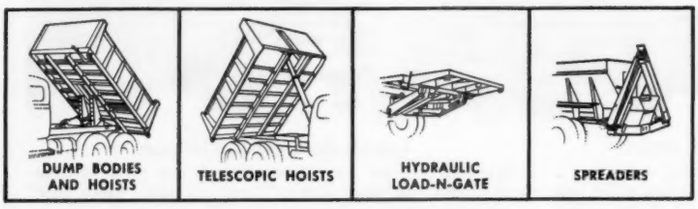

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Fast laydown and mixing operations produce a permanant compound of aggregate and asphalt

One of the first steps in the road-mixing process consists of leveling and equalizing the windrow of aggregate. A Caterpillar No. 12 motor grader performs this operation on a stretch of State Route 387 in northeastern Wyoming.

through actual field trials. This was particularly true when the mineral aggregate began to show certain annoying characteristics.

Eight miles north from the center point of the job—and representing that distance in dead haul, one way—Matheson set up a Universal 880 Junior Gravelmaster crushing and screening plant. This machine was equipped with an auxiliary International UD-18 industrial diesel, which furnished power for the 16×24 roll crushers in the plant. The Universal plant also was equipped with a 10×24 primary jaw crusher, also driven by the International diesel engine. Conveyor belts received their motive power from a Wisconsin air-cooled engine mounted in the middle of the setup. The screening arrangement consisted of routine screen decks which scalped all oversize material either into the jaw or the roll crushers. These crushers were arranged in the necessary closed circuit so that through material could be rerouted until it would pass one of the gradation screens.

Raw pit-run material entering this plant was originally part of an old riverbed. Streaky and varied as to content, the material showed PI readings from 3 to 7. Because it was desirable to reduce the PI reading to a safer figure, Matheson had to bring in and set up a Kolman screening plant to produce sand from a similar wash south of the project. An International TD-18A tractor with dozer was also used at the sand plant to push pit-run raw material to a feeder trap.

A fleet of eight new Dodge 2-ton trucks owned by the contractor hauled material from both plants, loading directly from the stacking conveyor belt. No surge bins were used.

The first construction move included ripping up the old bituminous pavement, reprocessing, and building up the subbase where necessary. Sections approximately a mile long were done at one time.

Matheson's two Allis-Chalmers

(Continued on next page)

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Jaeger Spreaders, Finishers help set the Ohio Turnpike record

7280 ft. of 12 ft. slab in 13-hour day

Base course: First paver and Jaeger Spreader lay base ready for steel. Spreader's screw thoroughly reworks and compacts concrete against subgrade and forms. Strike-off leaves rough textured surface to receive mesh.

This Ohio Turnpike record, by V. N. Holderman & Sons, required perfect organization, scheduling and teamwork. Good equipment helped, too. On top course, for example, the oscillating screed of the Jaeger Spreader accurately metered the concrete between paver and finishing machines. In addition, both Jaeger Finishers were equipped with rear screeds diagonally adjustable for any pitch or super-elevation of the slab. For more data, see your Jaeger dealer or ask for catalog.

THE JAEGER MACHINE COMPANY

701 Dublin Avenue, Columbus 16, Ohio

AIR COMPRESSORS • LOADERS • PUMPS • CONCRETE MIXERS • TRUCK MIXERS

Hooked up to the Seaman Trav-L-Plant, a GMC tanker delivers MC-3 through the pump and metering device on the Seaman rig. A grader just behind the Trav-L-Plant mixes the asphalt and aggregate immediately after the first injection of oil.

(Continued from preceding page)

AD-4 motor graders, along with a Caterpillar No. 12 machine, ripped up the old bituminous pavement with scarifier teeth. In some places, where the old bituminous mat had been patched by maintenance crews, thick chunks measuring approximately 15 inches square and from 2½ to 5 inches thick turned up. Most of the old mat, of course, was much thinner, and was broken up into much smaller pieces as the motor grader scarifiers did their work.

Breakup Work

To break this old bituminous cake down to a size where it could be worked in with the base material, Matheson purchased a Seaman Trav-L-Plant and equipped it with the heaviest possible tines for the job. The Trav-L-Plant pulverized the old bituminous cake by traveling through the material while it was laid out flat. After approximately four passes through the material, the old cake was broken up so that it could be mixed in with the new subbase.

Whatever extra granular subbase material was necessary was then hauled in by the Dodge trucks, dumped, watered if necessary, mixed, and blended by the Trav-L-Plant. Then it was laid out by one of the motor graders. Matheson had a Bros straight-wheel pneumatic roller on the job for compacting this material, and there was also a Galion two-wheel roller rated at anywhere from 8 to 12 tons, depending on ballast added. The completed 22-foot surface of any given section was sealed by a Rosco 1,250-gallon asphalt pressure distributor.

In the road-mixing step, work was done in sections which averaged ¾ mile per day, with crews working an 8-hour shift. The ¾-mile sections turned out to be ideal for two reasons. First, the distance was just right for the application of three ordinary transport truckloads of MC-3 asphalt. Second, when it became necessary to lay the material down promptly after the mixing operation, the ¾-mile section proved just about what crews could handle satisfactorily. It was also an ideal section to work because of the necessity for carrying automobile traffic through the job.

The necessary mineral filler to build the 1½-inch mat was trucked in, dumped, and equalized in a windrow by the motor grader. When a section was all ready for oil, one of the motor graders flattened the windrow so that it was approximately seven feet wide and contained enough material to make the entire mat. Based on approximately five per cent of MC-3 asphalt, each linear foot of this windrow required the addition of 2½ gallons of MC-3.

Bitumen Application

This bitumen was applied to the lift in three shots. The Trav-L-Plant is equipped with an accurate pump and metering device which gives unusually precise results. Asphalt transport trucks, hauling MC-3 oil from the Socony-Vacuum Refinery in Casper, moved in along the windrow and hooked up to the intake hose of the Trav-L-Plant. A safety chain was made fast so that the machines would stay together, and the two units then moved down the highway applying the first injection of oil. One gallon of the ultimate 2.5-gallon content was applied in this first pass. The Seaman machine, of course, did considerable mixing of the aggregate with the asphalt as the first pass was made.

Working immediately behind the Trav-L-Plant were at least two motor graders. These machines folded the flattened windrow, did additional mixing, and then reflattened the windrow. The next two passes were identical with the first, except that 0.75 gallon of MC-3 was added instead of the heavier shot of the first application.

The oiled section was next mixed out by the Trav-L-Plant and the two motor graders so that an intimate blend of asphalt and mineral aggregate would be obtained. It was here

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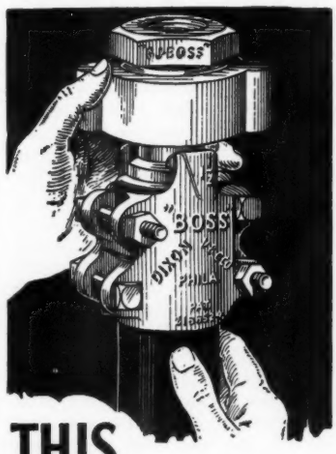

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GROUND JOINT
FEMALE COUPLING
STYLE X-34

All parts steel or malleable iron, thoroughly rustproofed. Sizes ¼" to 6", inclusive.

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that the operation ran into trouble during the early stages. Although the mix turned out well after approximately three hours of manipulative work by the Seaman and Allis-Chalmers machines, it failed utterly to do so if mixing was not done promptly. The asphalt went curiously dead if the windrow was left for any length of time. It was impossible to move in then and complete the mixing, or to lay and compact the windrow of material. Extra sand was added in an effort to break up the popcorn-like particles of material, but that did little good. Eventually, the windrow was resweetened by a light application of cutback asphalt, remixed, and relaid.

This rear view of the Trav-L-Plant shows the first shot of asphalt in ribbons along the roadway. Graders will blend the mixture before additional shots.

Faster Laydown Work

State highway engineers, who had encountered similar difficulties before, realized that the answer to the problem was more prompt laydown work after the manipulating process was finished. Every effort was made then either to lay down the road-mixed mat the same day it was processed or, in any case, not later than the next day. It was the only way to get the particles to stick together.

The processed windrow of road-mix material has been laid by blading into the windrow with motor graders, moving part of the material over the highway, and carrying the remaining part of the windrow to the opposite shoulder. During this operation, the Bros straight-wheel pneumatic roller works full time behind the motor graders, and a finish rolling has been a job for the Galion steel-wheel machine.

The steps in this typical section were simply repeated over and over to complete the job. Although some time was lost, and there were a few rough spots in ironing out the peculiar behavior of the mineral aggregate, the operation went smoothly because all of the contractor's equipment was practically new. With the help of a central camp setup, lubricating equipment, and a small mechanical force, Matheson kept his equipment in tip-top condition. There was no trouble whatever on that score. In fact, it was the work potential of his new equipment which saved the day, timewise, when his job was threatened by cold weather.

An RC-type sealcoat was used in the final operation. Hot oil, hauled in from the Casper refinery, was applied by Matheson's Rosco asphalt distributor, after which a light chip coat was applied to complete the waterproofing process.

Costing only $8,000 per mile, the job represents the many uses which still remain for road-mix or low-type bituminous pavements on secondary highways. The state of Wyoming still is using road-mix bituminous work with excellent results.

All Wyoming State Highway Department activities are under the general supervision of J. R. Bromley, state highway engineer. W. E. Sutton is department maintenance engineer. Local supervision was handled out of the Casper suboffice by John Atkins, district engineer. THE END

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U-1091, 200 hp. @ 1600 rpm Disp. 1091.6 cu. in., 6 cyls. (natural gas & LPG only)
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U-220, 62 hp. @ 2400 rpm Disp. 220.5 cu. in., 6 cyls.
U-9, 55 hp. @ 1500 rpm Disp. 334.5 cu. in., 4 cyls.
U-264, 52 hp. @ 1600 rpm Disp. 263.9 cu. in., 4 cyls.
U-164, 36.5 hp. @ 1800 rpm Disp. 163.6 cu. in., 4 cyls.
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U-1, 16.5 hp. @ 2500 rpm Disp. 59.5 cu. in., 4 cyls.

These are the 18 INTERNATIONAL *Power Units that save dollars for contractors by bringing them a full measure of economical power all the time. Each unit is the result of more than 50 years of research, engineering, and manufacturing know-how. That's why* INTERNATIONAL *Power assures more production at lower cost for earthmovers.*

Whether you specify power for new equipment—or repower a crane, a dragline, a crushing plant, or a shovel—or replace a small auxiliary engine—INTERNATIONAL Industrial Power can give you the right-size unit for the job.

You choose from 18 carbureted and diesel models, ranging from 16.5 to 200 net horsepower, each engineered to give you long years of higher production per horsepower and trouble-free operation.

If you've had experience with those tough INTERNATIONAL crawlers, you know how INTERNATIONAL engines stand up in rough going, cost less to operate. Leading equipment manufacturers power their products with INTERNATIONALS—the units designed to pay off on heavy-duty work.

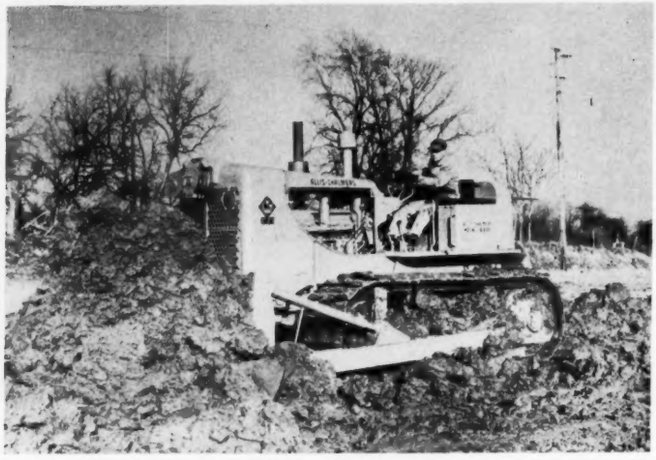
Your nearby INTERNATIONAL Industrial Power Unit Distributor or Dealer is a good man to know. He'll help you choose the right INTERNATIONAL replacement engine to lick your power problems, and he'll back it up with factory-trained service and parts. See him today for the full story.

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS

INTERNATIONAL HARVESTER

INTERNATIONAL® INDUSTRIAL POWER

MAKES EVERY LOAD A PAYLOAD



The new Allis-Chalmers HD-16 crawler tractor has a new A-C six-cylinder diesel engine. Both torque-converter drive and standard-transmission models are available. ►

New Diesel-Powered Tractor Available With Torque-Converter Drive or Standard Transmission

■ Allis-Chalmers announces its second completely new crawler tractor this year—the 31,500-pound HD-16, available with torque-converter drive or standard transmission. This model follows the 44,000 pound HD-21 tractor and the TS-360 motor scraper announced earlier this year.

The HD-16 has the new Allis-Chalmers six - cylinder 844 - cubic - inch diesel engine which develops 150 net engine hp at 1,800 rpm with torque converter and 140 net engine hp at 1,600 rpm with standard transmission.

A maximum drawbar pull of 60,000 pounds is obtained with torque-converter drive. The standard transmission tractor has a maximum drawbar pull of 31,700 pounds at rated engine speed. Under overload, the engine torque increases to give a drawbar pull up to 35,945 pounds at reduced travel speed.

The HD-16 has been designed with a steel, box-type main frame which makes possible unit construction for easy service accessibility. One-piece line-bored steering clutches and final-drive housing for long gear life; straddle-mounted double-reduction final-drive gears mounted on tapered roller bearings; and roller-bearing truck wheels with 1,000-hour lubrication are other features. In addition, the tractor has a new ceramic master-clutch lining and a newly engineered power train with correct gearing for developing high drawbar pulls.

New heat-treating methods provide optimum track hardness for the new Tru-Dimension track before machining to eliminate distortion from heat-treating.

An adjustable foam-rubber seat; fingertip control with hydraulic steering and a time-saving shift pattern; and 24-volt direct electric starting all contribute to operator comfort. In addition, the radiator guard tilts forward and down for easy accessibility.

A new line of matched equipment including dozers, shovels, scrapers, power-control units, and sideboom has been designed especially for the HD-16.

For further information write to Allis-Chalmers Mfg. Co., Tractor Division, Milwaukee 1, Wis., or use the Request Card at page 18. Circle No. 874.

East Coast Representative Appointed by Insley

The new east coast factory sales representative for the Insley Mfg. Corp., Indianapolis, Ind., is Edwin K. McGill. Mr. McGill, with 17 years' engineering experience in the excavator-crane field, will assist and coordinate sales efforts of distributors handling the Insley line of excavators, cranes, and concrete-handling equipment.

THIS AMSCO® LIP TAKES A SHARPER BITE

. . . chews out full loads at normal power

The lip juts way out where it easily bites up—and delivers—the full yardage of rock or earth. It's a sharp *extension* of the dipper, with fanned teeth—for fast, easy penetration. The dipper digs out a heavier load without strain on the shovel . . . even requires less power, and prolongs life of all parts.

This Amsco lip lasts a long, long time, because it's made of the toughest steel known—manganese steel—the metal that work-hardens to fight off wear by impact and abrasion. Lip replacement is simple, when necessary, keeping downtime short.

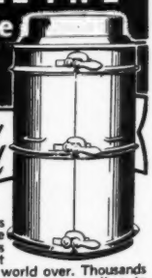
If getting more pay loads moved faster with less wear on equipment means more profits to you, *specify Amsco Renewable Lip Dippers.*

AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Ill.

For the FINEST CONCRETE PIPE You Need the FINEST FORMS!

THE "Quinn" Standard



Backed by over 40 years of reliable service, the QUINN STANDARD is recognized as the finest concrete pipe form the world over. Thousands of pipe manufacturers, from the smallest to the largest, look to Quinn for equipment to produce the finest concrete pipe at the lowest possible costs.

• QUINN HEAVY DUTY PIPE FORMS

For making pipe by hand methods by either the wet or semi-dry process. Sizes for pipe from 10" to 120" and larger. Tongue and groove or bell end pipe in any length desired.

WRITE TODAY for complete information and estimates.

Also manufacturers of QUINN CONCRETE PIPE MACHINES

Quinn WIRE & IRON WORKS BOONE, IOWA

This new Carver submersible sump pump has a capacity of 3,250 gph.

Submersible Sump Pump

■ A new submersible sump pump which will handle up to 3,250 gph has been placed on the market by Carver Pump Co., Muscatine, Iowa. The pump has no outside floats or rods; the motor housing acts as the float. The housing is adjustable to the desired operating range and will operate in water up to 15 feet in depth.

A 1/3-hp motor and switch are completely enclosed and sealed in the stainless-steel housing. No lubrication is required. The discharge outlet is threaded for 1¼-inch pipe.

For further information write to the company, or use the Request Card that is bound in at page 18. Circle No. 943.

New Trucks Have Engine With Fuel-Saving Features

■ Six new International trucks, the R-1700 series, powered by a new high-torque valve-in-head 140-hp gasoline engine, have been introduced.

The models, with gross vehicle weight ratings from 16,000 to 20,000 pounds, are the R-1700, R-1701 and R-1702 standard models, R-1703 Schoolmaster, R-1704 Loadster, and R-1705 Roadliner. Power plant of the units is the International Black Diamond 264, which delivers 234 pound-feet of torque at 2,000 rpm. Ratio of brake horsepower per cubic inch of displacement is 0.53.

The R-1705 Roadliner is rated at 35,000 pounds maximum gross combination weight. The three standard models are for straight truck service only. In the Loadster, Harvester offers a model for hauling heavy compact loads over rough type of terrain.

The six-cylinder International Black Diamond 264, newest of 32 engines available for International trucks, features a displacement 264.-33 cubic inches. To save on fuel consumption, the engine has a newly designed dual-barrel downdraft carburetor and improved manifolding. It features a new 11-inch clutch, controlled-expansion, three-ring aluminum pistons, and positive full-pressure lubrication.

For further information write to International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill., or use the Request Card at page 18. Circle No. 831.

High-Speed Electric Plant

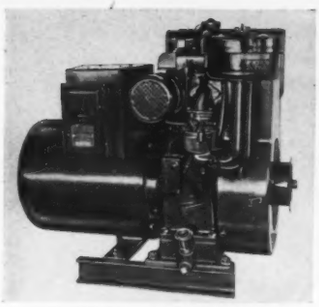
■ A Universal high-speed generating set just announced has an engine speed of 3,600 rpm. The Model 71-B is a 3,500-watt electric plant.

Power is supplied by an air-cooled, one-cylinder gasoline engine close-coupled to the generator. The 110 to 120 volt ac set is offered in 60 cycles, single phase. There is a choice of starting methods, including remote control for emergency service.

Completely self-contained, the Model 71-B includes a gasoline tank, adjustable fully enclosed mechanical governor, muffler, and rope starter for the manual starting model. In the electric-starting model, the engine is cranked by means of special winding in the generator.

The plant is 26 inches long and weighs 240 pounds in the manual-starting model.

For further information write to Universal Motor Co., Oshkosh, Wis., or use the Request Card at page 18. Circle No. 819.



The new Universal Model 71-B portable electric plant has been designed for a high operating speed.

Portable Fuel-Oil Heater

■ A portable fuel-oil heater for contractors is shown in a leaflet from L. B. White Co., Onalaska, Wis. The White Oil-Jet heater features a unique twin-pot design.

A pilot pot gives a small steady flow of heat which is constantly circulated by a jet blower. A master pot comes into operation through the heater's thermostatic control. The heater uses No. 1 fuel oil, No. 1 distillate, or kerosene.

Available in two models with 18 and 36-hour fuel capacities, the White Oil-Jet delivers up to 160,000 Btu per hour. Only 19 inches wide and rubber-tire mounted, the heater can be moved about the job easily.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 903.

ROSCOE CONNOLLY, PRESIDENT
CONNOLLY CONSTRUCTION CO., MARYSVILLE, OHIO

"K-45 Kompactor saves us up to 60% of normal compaction costs!"

estimates Ohio contractor who has operated his Kompactor since 1954

This field performance report on Buffalo-Springfield's revolutionary, high-speed K-45 Kompactor comes from Roscoe "Dutch" Connolly, president of the Connolly Construction Co., Marysville, Ohio.

"Our K-45 Kompactor has been in almost continuous use since early spring of 1954," says Mr. Connolly. "In our opinion, it is the best compaction machine available today. *It not only exceeds specified density requirements, but we estimate it saves up to 60 percent of normal compaction costs,* because it takes far less working time to meet required densities, and leaves a smooth-finished surface that prevents moisture from penetrating the material after the rolling is finished."

Mr. Connolly also appreciates the fact that the Kompactor is self-propelled, "and thereby requires much less total investment to handle compaction operations.

"We also like the Kompactor because we can work right *up close* to building foundations and bridge abutments, thereby eliminating at least 90 percent of the hand tamping work usually required on such jobs. And finally, we're sold on the K-45 because of its extremely low maintenance cost in comparison to other types of compaction equipment."

Have *you* seen a K-45 Kompactor in action? If not, you've missed an eye-opening experience. Check with your nearest Buffalo-Springfield distributor today for all the facts on this amazing machine that can literally *halve* your job compaction time and costs. Or send for free brochure that illustrates and describes the K-45 and what it can do for you.

BUFFALO ROLLER COMPANY — SPRINGFIELD, SPRINGFIELD, OHIO, U. S. A.

THE LEADER IN COMPACTION EQUIPMENT DESIGN AND MANUFACTURE

The 1955 GMC truck line includes more than double the number of models offered last year. Units offered range from 1-ton pickup trucks to 5-ton tractors. ►

New Truck Line Offers Advances in Engineering And Styling Features

■ A complete new line of GMC 128 trucks featuring new V-8 engines, streamlined design, and some 500 major styling and engineering improvements has been announced by GMC Truck & Coach Division, General Motors Corp., 660 South Blvd. East, Pontiac 11, Mich.

The 1955 line, which ranges from ½-ton pickups to 5-ton tractors, also features a new series of lighter-weight diesel trucks, expanded use of hydra-matic transmissions, and a unique dual-purpose truck series combining the advantages of cab-over-engine and conventional models. In addition, tubeless tires are now standard equipment on the light-duty Series 100 trucks.

The dual-purpose models are close-coupled units with 89-inch bumper-to-back dimensions. With set-back front axle, the new trucks provide the load-distribution advantages and turning qualities of cab-over-engine models and the easy accessibility and step heights of conventional units.

Six of these models are offered in the 1½ to 2-ton light-duty series, and others are available in the medium and heavy-duty classes.

The length of conventional cabs has also been revised to give better front-axle loading and permit the use of longer trailers within legal trailer-length limitations.

The new cab-over-engine diesel series, the DF860-67 and the DFW820-67, will feature a new 6-71 engine. This is a lightweight power unit in the 175-185-hp range and is built with many aluminum parts. It also has such new features as a 2-plate 14-inch clutch, as do three other GMC engines.

Two new V-8 engines for 44 of the 1955 GMC trucks include a 288-cubic-inch engine for light and medium-duty trucks and the 324 engine for medium and heavy-duty vehicles. Horsepower ratings are 155 and 175, respectively.

In addition, all of the GMC six-cylinder gasoline engines have been increased in power.

New styling features include large wrap-around windshields along with a lower cowl and hood, a jet-stream airscoop on the hood, and a wider and lower cab with greater interior space. Hidden running boards, a streamlined grille, header-bar and bumper assembly, and a two-cluster instrument panel are other style advances. The trucks are available in 13 exterior colors.

For further information write to the company, or use the Request Card at page 18. Circle No. 850.

The new Minneapolis-Moline Model UO wheel-type disk harrow.

Wheel Type Disk Harrow

■ A new Minneapolis-Moline wheel-type disk harrow is offered in 9, 10, 11, and 12-foot sizes.

The pull-type unit is built on a rigid welded and bolted steel frame, with a drawbar designed to give equal distribution of pull over the whole frame.

To fit all makes and models of farm-type tractors, the Model UO has a flexible clevis-and-pin hitch. Wheels

Repair Material Extends Life of Conveyor Belt

■ A self-vulcanizing rubber material for repairing rubber conveyor belts is available from Flexible Steel Lacing Co., 4607 Lexington St., Chicago 44, Ill. The REMA repair material consists of abrasive-resistant cover stock and rubber filler that self-vulcanize by a chemical process. No heat or heavy equipment is necessary for its use.

For further information write to the company, or use the Request Card that is bound in at page 18. Circle No. 944.

The river pours in — cofferdam piles spring leaks — men take risks or work is held up by flood water.

Dependable pumps are of vital importance, working side by side with the men, shift after shift, day in, day out.

To meet target dates, concrete pouring must be non-stop, trucks must move, the job must hum! Keep pumping and you do it.

Make sure — put Gorman-Rupps on the job *before* you have trouble. Our plain language guarantee is backed by a long record of proven performance *On-The-Job.*

**Ask for Bulletin and the Guarantee*

NOTES FROM THE FIELD

At the Sandusky River bridge on the Ohio Turnpike Gorman-Rupp pumps worked around the clock with men on 3 shifts. At times they pumped 3 weeks continuously, 24 hours a day and no trouble.

THE GORMAN-RUPP COMPANY
MANSFIELD, OHIO

FIRST THING WE CALL FOR . . . on any job!

IS OUR

WHEELER
SOUND POWERED *Electric*
TELEPHONES

- ▶ NO BATTERIES. No outside power.
- ▶ LOW in FIRST and LAST COST.
- ▶ CLEAR SPEECH. CLEAR SIGNAL.
- ▶ ALWAYS READY IN EMERGENCY.
- ▶ No electrical hazard.
- ▶ UP TO 12 stations intercom.
- ▶ SIMPLE standard WIRING.
- ▶ Corrosion-resistant construction.

Write for full information and prices.
ASK ABOUT NEW EXECUTIVE-TYPE CRADLE PHONE.

Built and Guaranteed by
the **WHEELER**
INSULATED WIRE CO., INC.
DIVISION OF THE SPERRY CORPORATION
1134 East Aurora Street, Waterbury 20, Conn.

4WHS6C

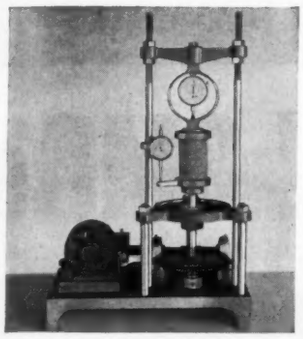
for 6.70×15 pneumatic tires are standard equipment. Hydraulic or manual lifting mechanism is provided.

Front and rear gangs have separate angular and lateral adjustments. Angular adjustments are from 15 to 25 degrees. Front gangs can be adjusted laterally ¾ inch, and rear gangs 3½ inches. Disks are either 18 or 20 inches in diameter.

For further information write to Minneapolis-Moline Co., Box 1050, Minneapolis 1, Minn., or use the Request Card at page 18. Circle No. 836.

New Testing Machine Has All Controls for Triaxial Shear Testing

■ All controls necessary for both routine and special triaxial shear testing of soil are incorporated in the new compact Olsen K-W triaxial testing machine. Actual field conditions can easily be simulated with this new table-mounted unit, as any desired lateral pressure up to 50 psi can be



applied to the sample and maintained with either air or glycerin. Precision needle valves provide complete control of all phases of the test.

The K-W triaxial testing machine is available in three models with varying load capacities of 100, 250, or 500 pounds. The Model 500, which is normally used with a 500-pound load capacity, is designed for a maximum 2,000-pound capacity. It also has a variable speed drive up to 0.2 inches per minute.

All three models can be converted into unconfined-compression testing machines by removing the test chamber and making a few minor adjustments. The Model 520 can also be adapted for California bearing ratio penetration tests.

For further information write to the Tinius Olsen Testing Machine Co., 5074 Easton Road, Willow Grove, Pa., or use the Request Card at page 18. Circle No. 869.

Additive Gives Adhesion To Cutback Asphalt Mixes

■ Instructions on the production of cutback asphalt mixes with Kotal and lime are contained in a folder available on request. These mixes are based on treating wet or dry aggregate with lime, and adding Kotal to the bitumen. The lime precipitates the Kotal and forms a Kotal-lime compound on the aggregate.

The effect of this treatment is reported to be an increased adhesion of the bitumen to the aggregate, resulting in a more stable pavement which will not ravel.

To obtain this literature write to Kotal Co., 360 Springfield Ave., Summit, N. J., or use the Request Card that is bound in at page 18. Circle No. 945.

The Waikiki No. 4820 space heater circulates up to 2,500 cubic feet of heated air per minute.

New Space Heater for Construction Use

■ A semiportable space heater that can be used to heat buildings under construction or for concrete curing is made by Vapor Heating Corp., 6420 W. Howard St., Chicago 31, Ill. The Waikiki No. 4820 space heater heats and circulates as much as 2,500 cubic feet to as little as 900 cubic feet of air per minute.

The heater has a home-type oil burner and may also be equipped with a natural gas or bottled gas burner. Interchangeable fuel nozzles give from 80,000 to 200,000 Btu input. A squirrel-cage-type blower circulates air around three combustion chambers.

For further information write to the company, or use the Request Card at page 18. Circle No. 946.

Wellpoint Equipment

■ Its complete line of wellpoint pumping equipment is illustrated in a booklet offered by the Foundation Equipment Corp., 38th Ave. and 10th St., Long Island City 1, N. Y. The bulletin contains complete details on wellpoint and jetting pumps.

A complete description of the Free-flow wellpoint is also included, together with information on fittings and adaptors.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 823.

PAYLOADER® PROVEN PERFORMANCE means Satisfied Customers

There's one sure way to find out what a machine can do — by using it on your jobs. That's what we mean by proven performance. It's what brings a user back to his Distributor to buy "PAYLOADER" tractor-shovels — again and again. For example, one Distributor reports that over 70% of his 1954 "PAYLOADER" sales was repeat business.

"PAYLOADER" is more than a name for a Hough tractor-shovel — it's a complete line of *proven* models, and complete Distributor parts-service that spells *proven* performance and *satisfied* customers. The Frank G. Hough Co., 762 Sunnyside Avenue, Libertyville, Illinois.

Andrew Catapano Co., one of the largest, most progressive sewer contractors in the New York metropolitan area, has used 2 cu. yd., 4-wheel drive "PAYLOADER" tractor-shovels since 1951—recently bought two more.

The Frank G. Hough Co.
762 Sunnyside Ave., Libertyville, Ill.

Send me literature on the full "PAYLOADER" line and the many available attachments.

Name

Title

Company

Street

City State

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. • LIBERTYVILLE, ILL.
SUBSIDIARY, INTERNATIONAL HARVESTER COMPANY

AVOID LEGAL PITFALLS

Edited by A. L. H. STREET
Attorney-at-Law

Blasting Held Cause Of Damage to Building

THE PROBLEM: *Rebuilding a highway involved blasting about 35 feet from a 50-year-old building. After the job had been completed, a wall and the foundation of the building were found to be cracked. A contractor testified that the wall and foundation were in good condition shortly before the blasting and that his examination of the site convinced him that the damage had been caused by negligent blasting. Was his testimony, considered that of an expert, sufficient to justify a jury in deciding that the highway contractor was liable?*

THE ANSWER: Yes. (Crocker v. W. W. Wyman, Inc., 110 Atl. 2d 271, decided by the New Hampshire Supreme Court.)

The court ordered a retrial of the case saying that the trial judge had mistakenly dismissed the case on the ground that there was insufficient proof of the cause of the damage to permit the jury to find that the contractor was liable. But the Supreme Court agreed with the trial judge in that there was not enough proof to show that the damage, or some of it, had been caused by operation of a bulldozer in an excavation close to the building.

Dumping of Waste Material Into Street

THE PROBLEM: *If a contractor in building a structure dumps waste material into a street in such way that it runs down a slope of the street, causing an accident to a traveler below, can the contractor be held liable in damages?*

THE ANSWER: Yes. (MacLean v. City and County of San Francisco, 273 Pac. 2d 698, decided by the California District Court of Appeals, First District.)

But, in this case, the court decided that there was no proof that the substance upon which an alighting bus passenger slipped and fell was mortar that had washed down a street abutting upon construction work.

Pretrial Rights in Performance Dispute

THE PROBLEM: *A sewer-lines contractor sued to collect a balance due, which the town withheld because, allegedly, the work was not fully and satisfactorily performed. The sewer lines were connected with a sewage-disposal system. Because the disposal plant could affect the construction, capacity—and functioning of the sewer lines, was the contractor in preparing for trial, entitled to require the town to produce the plans, drawings, and specifications for inspection?*

THE ANSWER: Yes. (E. Totonelly Sons, Inc. v. Town of Fairfield, 122 Fed. Supp. 849, decided by the United States District Court, District of Connecticut.)

But the court refused to require the town to produce reports of tests by its engineers of sewer lines other than those constructed by the contractor, and refused to permit the contractor to conduct infiltration tests of those other lines.

Suit Was Too Late

THE PROBLEM: *A contractor completed work on a housing project and was paid in full. More than 2½ years later, damage was caused by an explosion allegedly due to negligent fitting of a gas-pipe union 6 feet underground. Did the time limit within which the owner could sue the prime contractor run from the date of the explosion or from the date of defective construction?*

THE ANSWER: From the date of defective construction. (Richmond Development & Housing Authority v. Laburnum Construction Corp., 80 S. E. 2d 574, decided by the Virginia Supreme Court of Appeals.)

The court recognized that where one has rendered himself liable by wrongful act or breach of contract and has fraudulently concealed that fact from the other party, the time limit for suing may not begin until the other party knows, or ought to know, that there has been a breach of contract or wrongful act. But there was nothing in this case to show that the work was deliberately left in such defective condition as to make an explosion probable and nothing to show that there had been any fraudulent concealment of facts from the owner.

The court said that there was a special clause in the contract that put the contractor in the clear. It was a clause to the effect that the contractor would remedy any defects in the work and pay for any damage to other work caused by such defects, if the defects were discovered within one year from the date of final accept-

They're here! GMC's ten-wheelers...
GMC
630
BLUE CHIP
GMC
TRUCKS
Model MW630-50 (46,000 GVW) above is one of GMC's new ten-wheelers—now available up to 59,000 GVW. It is powered by an improved 225 h.p. gasoline engine—has Hydra-Matic Drive.

These brief extracts of court decisions may aid you. Local or state laws may alter conditions in your community. If in doubt consult your own attorney.

ance. Admittedly, no defects were discovered and no damage caused within that time limit.

"Final Payment" Defined

THE PROBLEM: *A subcontract specified that payment should not be made before the prime contractor received final payment from the government. Final settlement was reached, and the government paid the prime contractor most of the price, retaining a small portion because of the contractor's insolvency and consequent taking over of the work by his surety. Was the subcontractor entitled to sue on the prime contractor's payment bond?*

THE ANSWER: Yes. (United States for Use of Bailey v. United Pacific Insurance Co., 122 Fed. Supp. 48, decided by the United States District Court, District of New Mexico.)

The court reasoned: Although the subcontract provided that the prime contractor would not become liable to the subcontractor until "final payment" was made by the government, those words should not be read as meaning complete final payment. That would forfeit the subcontractor's rights under the bond, because the holding up by the government of payment of a few items due the prime contractor could serve to delay indefinitely, if not entirely defeat, a subcontractor's legitimate claim.

Sales Tax Not Due on Goods Entering State

THE PROBLEM: *An Oklahoma contractor bought firebrick and fire clay outside the state and had it shipped in for use in performing a contract in which he had agreed to furnish labor and materials for a lump sum. Were the purchases subject to Oklahoma sales tax?*

THE ANSWER: No. (Harding v. Oklahoma Tax Commission, 275 Pac. 2d 264, decided by the Oklahoma Supreme Court.)

In deciding that the contractor was a consumer not a retailer of the materials, the Oklahoma court cited supporting decisions rendered by the appellate courts of Louisiana, Missouri, Pennsylvania, New Mexico, Arizona, Colorado, Tennessee, North Carolina, Ohio, and Maryland.

Accident on One-Way Road: Contractor Was Not Liable

THE PROBLEM: *A state road-resurfacing contract bound the contractor to station flagmen to guide traffic around equipment and areas where work was in progress. Traffic moved on one lane while the other was being resurfaced. Flagmen employed by the state directed traffic where the open lane ended. A car entering the open lane from a private driveway at a midway point in the lane drove against approaching traffic and collided with the plaintiff, injuring him. The accident occurred in an area where no work was in progress and no equipment was stationed. Since the contractor was bound to maintain flagmen to guard against such accidents, was he liable for the plaintiff's injuries?*

THE ANSWER: No. (Faull v. Abbot, 73 S. E. 2d 727, decided by the West Virginia Supreme Court of Appeals.)

The court reasoned that the cost of highway construction would be unduly increased at public expense if contractors were required to station a guard at every private entrance to the highway or if the state were required to police such portions of highways.

The court referred to one of its previous decisions to the effect that, in the absence of special contract or special circumstances, a street contractor is not bound to maintain a temporary detour around an obstruction caused by excavation. (Nester v. United States Foundation Corp., 67 S. E. 2d 533, 534.)

Use Tax on Asphalt Plants

THE PROBLEM: *The Maryland sales-tax law exempted from use tax chattels "not readily obtainable in the state" which are stored, used, or consumed in the state in rendering business services. Under this law, are batch-type asphalt plants of substantially the same kind as those obtainable in Maryland subject to the use tax, even though they offer the added feature of a double-shell dryer not available on the plants sold within the state?*

THE ANSWER: Yes. (Comptroller of the Treasury v. Smith, 109 Atl. 2d 47, decided by the Maryland Court of Appeals.)

The court remarked: "It is natural for a manufacturer to claim and to honestly believe that his product is the best. If a claim of special features or advantages were the only test of product superiority, the door would be

19 new Blue Chip
and 9 of them are Hydra-Matic*

Now—here's an entire new line of super ten-wheeler trucks—in the Blue Chip GMC's for the construction field! In 19 extra-rugged models—all the way up to 59,000 GVW—you get:

BLUE CHIP POWER—All 19 have new, power-boosted engines. 4 gasoline and 2 Diesels cover a 155 to 230 h.p. range. And GMC's new 175-h.p. V8 makes its bow in 40,000 GVW models.

BLUE CHIP RUGGEDNESS—Frames are up to 11% stronger. For extra-tough work, stress-relieving reinforcements to the end of the frame are now factory-installed.** Clutches are larger on manual-shift models. Axles are bigger—front and rear on most models.

BLUE CHIP CHOICE OF HYDRA-MATIC MODELS—Hydra-Matic's extra protection is now available up to 46,000 GVW. It ends all the time and money lost to clutch troubles—to shock-loading damage—to engine strain.

BLUE CHIP DRIVER EFFICIENCY—Hydra-Matic makes any driver an expert. All gearshifting duties are handled automatically. Trucks are spared abuse. Fuel savings are impressive. Safety Power Steering** is available on all 19 trucks.

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opened to claims of uniqueness that would defeat the purpose of the statute. This is the elimination of a tax advantage on articles of the same general character that are sold in competition."

Liability Insurance

THE PROBLEM: *A construction company carried a liability insurance policy worded as many such policies are, to the effect that it would cover the contractor's liability for damages caused by "accidents", and that the company would defend any suit brought against the contractor for such damages. A contract with a building owner required the contractor to open a roof but not to close it. Possibly, he agreed to do so later. Before the opening was closed, rain damaged contents of the building. (1) Did the policy cover the damage? (2) Was the insurance company bound to defend the owner's suit against the contractor?*

THE ANSWERS: (1) No. (2) No. (Midland Construction Co. v. United States Casualty Co., 214 Fed. 2d 665, decided by the United States Court of Appeals, Tenth Circuit.)

(1) The court said that rain cannot be regarded as an "accident", which is an unusual or unexpectable event.

(2) Under the policy, the insurance company would have been required to defend the suit against the contractor had it been based upon claim of facts showing accidental damage, even if the claim had been false. But, the court said, where the claim shows that it is not covered by the policy, the insurance company is not bound to defend on behalf of the insured contractor.

Responsibility for Delay

THE PROBLEM: *Highway-construction specifications called for stone blocks to be used in a parking area. The blocks were to be not less than six inches long, and at least 85 per cent of them were to exceed that length to allow for overlap. A delivery of blocks at the site consisted of 6-inch blocks only, and the highway engineer objected to their use. Later he waived his objection. Did the contractor have a good claim for damages resulting from the delay while use of the blocks was forbidden?*

THE ANSWER: No. (Hudson Contracting Corp. v. State of New York, 135 N. Y. Supp. 2d 891, decided by the Appellate Division of the New York Supreme Court.)

The court okayed a ruling by the state Court of Claims that the delay was caused by the contractor's failure to comply with the specifications. The fact that the engineer later relaxed the dimensions requirement because of the difficulty in procuring the specified blocks did not make the state liable for the delay.

Accident Due to Shovel

THE PROBLEM: *A Wisconsin statute requires an employer to provide a safe place of employment. Does the statute apply to excavation operations involving use of power shovels, when there is no defect in the shovel?*

THE ANSWER: No. (Deaton v. Unit Crane & Shovel Corp., 61 N. W. 2d 552, decided by the Wisconsin Supreme Court.)

The accident in this case allegedly was caused by the way the shovel operator lowered or dropped the shovel bucket or by failure to warn the plaintiff, who was injured while guiding the bucket.

The decision is in line with what most courts have declared, that a rule of law requiring an employer to provide a safe place of work does not apply to operations which in themselves create or change the character of the place of work. But of course, the employer may be liable for injuries resulting from neglect to provide reasonably safe equipment for the use of his workers.

The court also decided that if the injured man officiously attempted to guide the shovel bucket after being warned not to do so, he was a trespasser, and the shovel operator owed no legal duty to him other than not to wantonly or willfully injure him.

Roof Was Defective

THE PROBLEM: *Ordinarily, where a contractor's work is defective, the owner is entitled to damages measured by the cost of remedying the defects if that is less than the cost of complete reconstruction. A contractor laid a roof of tiles, which did not fit together, causing leakage. He disregarded the manufacturer's laying instructions furnished with the tile. The owner had another contractor replace the roof with another make of tile. In the first contractor's suit to enforce a mechanic's lien against the building, there was evidence tending to show that the first tile could not have been laid in straight lines had they been properly interlocked. Was the owner entitled to defeat the lien and compel the first contractor to refund what had been paid on the price?*

THE ANSWER: Yes. (Williams v. Elliott, 273 Pac. 2d 953, decided by the California District Court of Appeals, First District.)

Contract Was Not Legally Signed

THE PROBLEM: *A Missouri statute provides that no county or municipality shall make any contract unless it be in writing and signed by agents "duly appointed and authorized in writing." Another statute requires the board of aldermen of a city to keep a record of its acts. The mayor and clerk of a city signed a contract, on behalf of the city, employing an engineer to prepare sewer plans and specifications, but there was no record that they were authorized to sign the contract. Was the contract void,*

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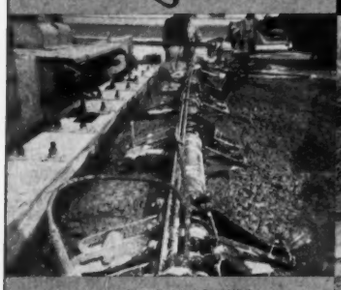

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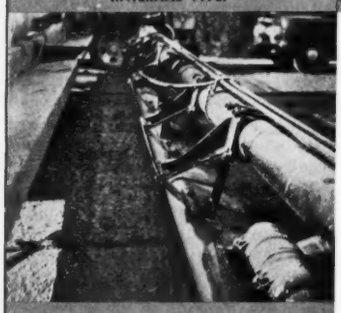

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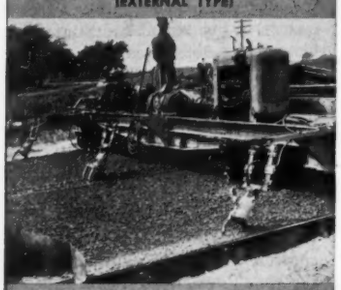

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In very thick concrete slab construction, such as used in airport paving, the super powerful JACKSON PAVING TUBE, of the internal type, gives full width, full depth vibration of the concrete. Attached to a standard finisher or spreader, it saves time, cement; provides greater density and compressive strength. Controlled by finisher or spreader operator.

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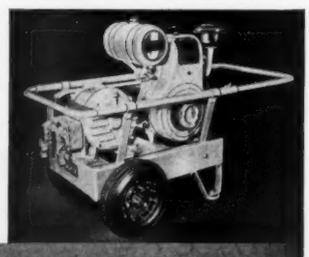

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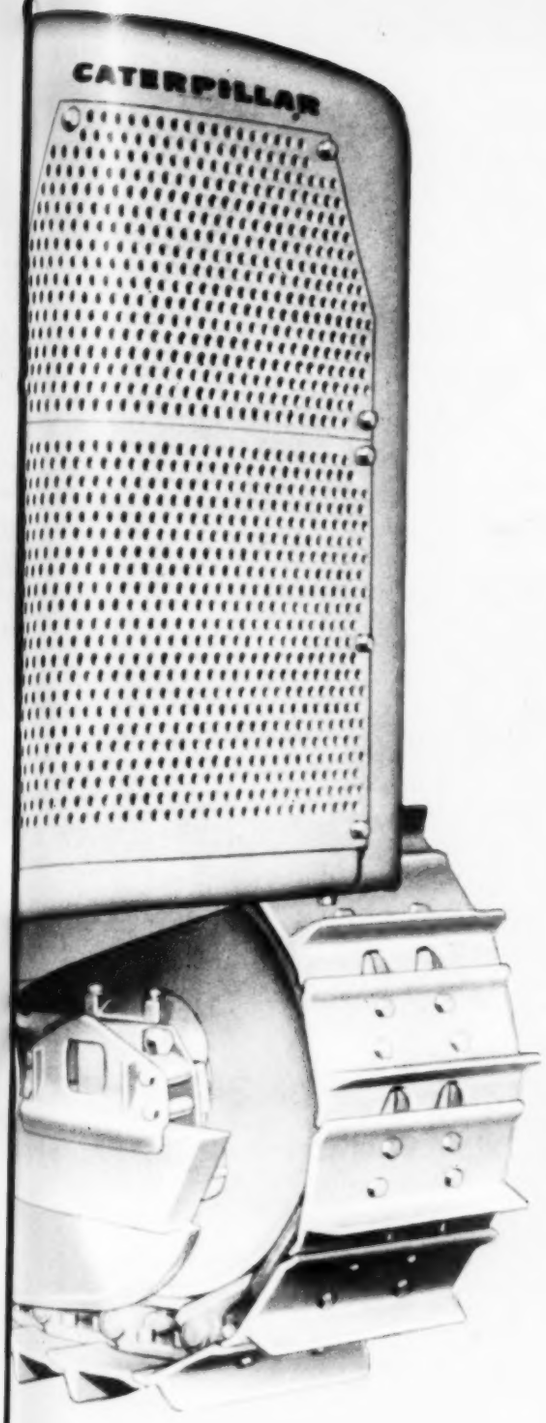

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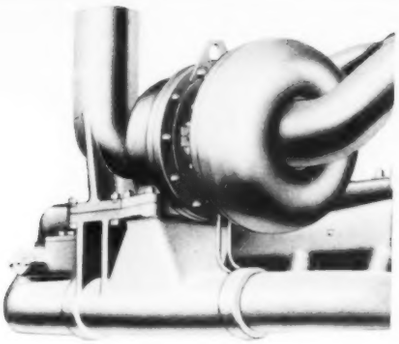
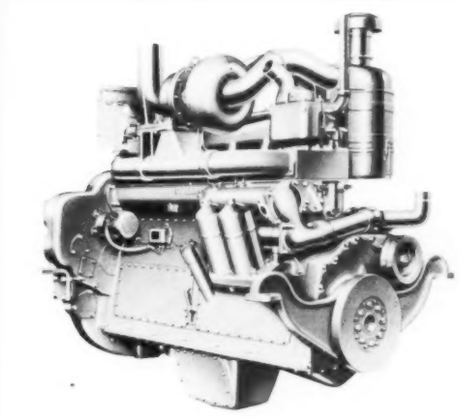


FIRST TRACK-TYPE TRACTOR WITH TURBOCHARGER!

The D9's new Turbocharger is driven by the engine exhaust, utilizing energy which would otherwise be lost. In addition, it packs air into the engine according to engine *load*, not speed. This means more working horsepower—greater performance.

CHOICE OF TORQUE CONVERTER OR DIRECT DRIVE!

Two types of drives are available, the exclusive Caterpillar oil clutch with six-speed (forward and reverse) transmission or a three-stage torque converter with 5:1 torque ratio. The transmission used with the torque converter has three speeds forward; two reverse. This option enables you to match the drive you want to your job requirements.



COMPLETELY NEW 286-HP ENGINE!

In addition to the Turbocharger, the powerful new D9 Engine features a 6¼" bore and 8" stroke and runs at 1200 r.p.m. Long life and dependability are promoted by stationary oil jet piston cooling; short, rigid valve push rods give smooth, accurate valve action; "Hi-Electro" hardened gear at the rear of the crankshaft drives timing gears and accessories; and many other advanced features.

WIDE RANGE OF OPERATING SPEEDS!

TORQUE CONVERTER:

3 speeds forward, 0 to 4.1 m.p.h., 0 to 5.7 m.p.h., 0 to 7.8 m.p.h.
2 speeds reverse, 0 to 4.1 m.p.h., 0 to 7.8 m.p.h.

DIRECT DRIVE:

6 speeds forward, 1.6, 2.1, 2.9, 3.9, 5.0, 6.8 m.p.h.
6 speeds reverse, same.

CONSTANT-POWER DRIVE FOR REAR-MOUNTED EQUIPMENT!

You always have power for cable controls, direct from the engine's rear power take-off. This makes cable control operation completely independent of flywheel clutch or torque converter and gives you a big boost in operating efficiency.

The D9...
proven in the field for a year!

Though new, the D9 is already a veteran. After exhaustive proving-ground tests, several D9s have been tested for over 19,128 hours on the toughest jobs in logging, construction, mining and quarry work. These jobs tested every square inch of this mighty new machine. The word from the field: "By far the best big tractor ever made."

Rugged—
and easy to service!

From its one-piece welded steering clutch case-frame assembly, to its track shoes hardened by the "Water Quench" process, the D9 is the toughest crawler built. And it's designed for easy servicing. Oil clutch, torque converter, transmission case and steering clutches can each be removed individually without disturbing other components. Hydraulic track adjusters are among the many other features for fast, easy adjustment and service work.

Brief specifications

Length: 17' 10¾"
Width: 9' 11¼"
Height: 8' 9"
Gauge: 90"
Weight: 54,000 lb. approx., dry
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Easy to operate!

- The independent "live-shaft" drive for cable controls makes operation smoother, easier.
- Hydraulic boosters provide both power steering and power braking.
- Adjustable seat, all-around visibility, easy access to all controls make operator's job simpler.
- Important new 7-roller track frame improves stability, flotation and ride.
- New starting engine has electric starting system and simple single-lever control for easy operation from the seat and insures fast starts in all weather.

Equipment

New CAT*-built 'Dozers for the D9: the No. 9S Bulldozer, modified straight blade; the No. 9A Bulldozer, angling blade.

New Cat-built Cable Controls: the No. 29 rear-mounted, double drum; the No. 30 front-mounted, single drum.

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giving the city a good defense against suit to collect a balance due on the contract and the right to force a refund of what had been paid?

THE ANSWER: Yes. (Fulton v. City of Lockwood, 269 S. W. 2d 1, decided by the Missouri Supreme Court.)

And the court decided that, because of the statutory requirement for a record showing authority to sign the agreement, the situation could not be remedied by proving that the aldermen had actually authorized the signing.

The effect of the decision—in line with what courts throughout the country have decided—is that everyone who contracts with a public agency is bound to know whether or not all steps essential to legality of the contract have been taken.

It seems to be almost universally customary to embody in a resolution or ordinance which provides for execution of contracts and other documents on behalf of a city special authority or direction that it be signed by specified officials.

Defect in Bid Did Not Prevent Contract Award

THE PROBLEM: *Bidding instructions on a state highway bridge job called for listing material men who had committed themselves to furnish necessary materials. There was no statute that required that this information be secured before accepting a bid. The lowest bid was $1,242,171, and the next bid was some $15,000 more. The lowest bid did not list the material suppliers, but a list was furnished the day after the bids had been opened. Did the State Highway Department act illegally in awarding the contract to the lowest bidder?*

THE ANSWER: No. (Bader v. Sharp, 110 Atl. 2d 300, decided by the Delaware Chancery Court.)

The decision is specially important in its drawing of lines between cases where noncompliance with bidding specifications can be waived by the contracting authority and cases where an award cannot be legally made. The court noted that the validity of an award usually depends upon whether the irregular proposal gives the bidder an undue advantage over other bidders. But chiefly important is the safeguarding of the public against wasting funds.

A line is to be drawn between cases where the contracting authority has no right to make an award because of noncompliance with a statutory requirement and cases where the defect in the bid is informal but not substantial, permitting the authority to accept or reject the bid.

Storm Victim Is Denied Workmen's Compensation

THE PROBLEM: *While going from his place of work to sleeping quarters provided by his employer, a Tennessee worker was killed on the highway by a storm. Was the death so related to the employment as to entitle his dependent wife to an award under the Tennessee workmen's compensation law?*

THE ANSWER: No. (Jackson v. Clark & Fay, 270 S. W. 2d 389, decided by the Tennessee Supreme Court.)

The court reasoned that injuries or death due to "acts of God" are compensable under the law only when the nature of the employment is such as to create a peculiar hazard not common to the public in general. For example, a workman is covered if his work compels him to overexert himself in hot sun. But in this case, the workman was no more exposed to storm hazards than any other traveler on the highway.

The court cited a case where the Indiana Appellate Court decided that compensation was properly awarded where an employee at work was directed to take shelter at a safe distance from explosives during a storm and was struck by lightning while doing so. (E.I. DuPont De Nemours Co. v. Lilly, 75 N. E. 2d 796.)

Latent Defects in Work

THE PROBLEM: *When the owner accepted a building, there was nothing to indicate that the plaster and stucco on walls would soon crack because of defective construction of the building. Did the owner forfeit right to collect damages on cracks appearing?*

THE ANSWER: No. (Pillsbury v. Blumenthal, 272 Pac. 2d 326, decided by the New Mexico Supreme Court.)

The court applied a rule of law that has often been followed by appellate courts throughout the country, to the effect that, ordinarily, when faulty workmanship is concealed when an owner pays the contract price and accepts the job, he can collect resulting damages on discovering the defects. (This rule is not apt to be followed by any court in a case where the owner's engineer or architect has inspected the work as it progressed and approved it, without any fraudulent collusion by the owner's representative and the contractor.)

War Conditions Did Not Excuse Default

THE PROBLEM: *A housing contractor could not complete the job within the 90-day contract time limit, because of economic conditions caused by the Korean War. The contractor abandoned the job because of financial difficulties, instead of completing the work as soon as otherwise would have been possible. Was the surety on his performance bond released from liability to the owner?*

THE ANSWER: No. (Peerless Casualty Co. v. Weymouth Gradens, Inc., 217 Fed. 2d 362, decided by the United States Court of Appeals, First Circuit.)

The court said that increased labor and material costs caused by unexpected outbreak of war do not excuse performance when possible.

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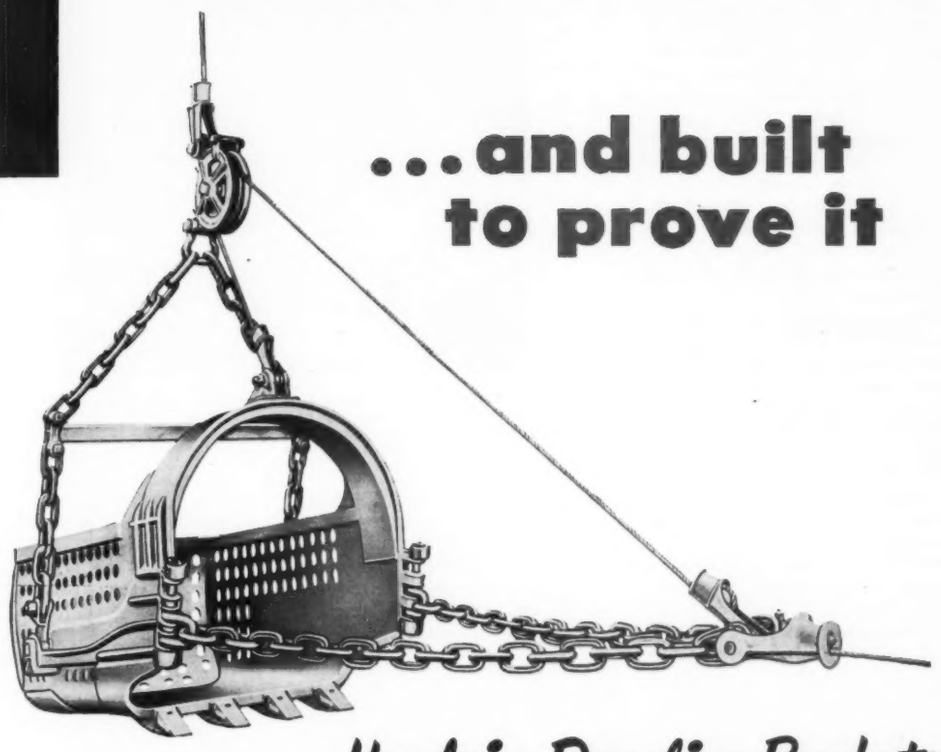

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After columns have been erected on the seventh floor, floor beams are set by steel workers. At right, the swingman rotates the guy derrick with a big pipe to swing the steel into place.

Steel flooring permits fast work on new building

by RALPH MONSON, field editor

Mushrooming quickly in the latter half of 1954, the new 12-story home office building of the Ford Motor Co. in Dearborn, Mich., now stands ready for finishing touches before its completion early next year. The setting of structural steel—now complete on the multimillion dollar project—was done at a fast clip through the use of modern techniques and materials, including steel flooring, and rivets and high-tensile bolts for field connections.

Its 12 stories topped by a three-story penthouse, the 536×85-foot office section has an adjacent garage and service station measuring 410×257 feet. This will house service facilities and provide three levels for automobile parking. Altogether, the project will have slightly less than a million square feet of floor area.

Steel erection was done by three big guy derricks which set steel two stories at a time. The rigs then literally pulled themselves to a new position atop the highest steel, set steel for another two floors, then continued upward until steel was set for the three-story penthouse.

As they raised the structural steel, the guy derricks also left large bundles of steel floor sections at each floor level. Resembling huge honeycombs, these bundles of Robertson Q-floor steel decking formed the basic building floors. A small crew of workmen opened the bundles, slid the individual sections into place, and welded them to the structural frame. Without waiting for forms or concrete, workmen had a permanent subfloor on which to work. The steel decks also provided a solid roof protecting workmen on lower floors from falling objects.

Using a Chicago Pneumatic air-powered impact wrench, a workman tightens a ⅞-inch bolt in one of the columns. About 75 per cent of the field connections are made with bolts.

Welding sections of Robertson Q-floor to the floor beams. Welded cover plates at the joints keep the concrete out of the openings.

This Central Staff Office Building was divided into five prime contracts, two of which—for the foundation and superstructure — went to Bryant & Detwiler Co., Inc., Detroit, Mich. The Raymond Concrete Pile Co., New York, N. Y., had the piling contract, which included a substantial portion of the excavation. Bethlehem Steel Co.'s construction division furnished and erected the structural steel frame, and H. H. Robertson Co., Pittsburgh, Pa. was awarded the contract for the cellular steel flooring.

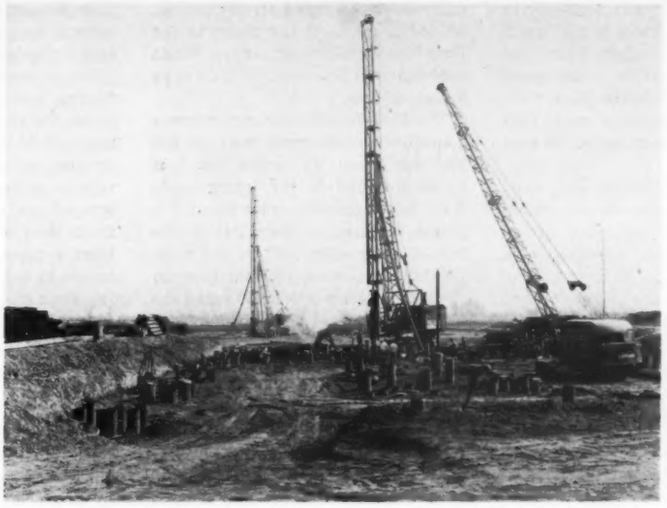
Skidmore, Owings & Merrill, New York, N. Y., designed the building and is providing supervision for construction. Weiskopf & Pickworth, together with Jaros, Baum & Bolles, both New York City firms, were consultants. Construction of the facility is being coordinated by the Ford office of plant engineering.

Excavate During Winter

Excavation started in September, 1953, and was completed that winter with only a little delay due to snow or cold. Muddy conditions at the site played a part in the selection of excavating equipment. Three Tournapull C Roadsters and a pair of Caterpillar D8 tractors and scrapers made

Three guy derricks with 110-foot masts and 100-foot booms work on the structural steel frame of the 12-story home office being built for the Ford Motor Co. in Dearborn, Mich. The floor system is laid after columns are erected two stories at a time.

Clusters of steel shells, which will be filled with concrete to form the foundation for the building, are driven by two Raymond pile drivers with leads capable of handling piles up to 70 feet long. A Lorain crane assists in the operation.



Floor protects crews working on lower levels of 12-story office; rivets and high-tensile bolts are used for field connections

the first cut, digging approximately 7 feet deep and leaving a 3 to 1 slope all around. An International TD-24 tractor push-loaded the scrapers in the hole. The material was stockpiled on the site for future use in backfilling and grading.

The first cut was made far enough outside the building lines to permit a 20-foot berm all around at the 7-foot depth, plus a 1 to 1 slope for the remaining 10 foot cut. Lima and Bay City draglines did much of the deeper excavation, loading the material into a fleet of LeTourneau rear-dump wagons drawn by the tractors. These wagons with extra large tires were about the only vehicles which could operate off the roads at the muddy site. They were also given the job of hauling broken concrete and rock used to build roads through and around the site for other vehicles.

Footing holes were roughed out with draglines and clamshells and finished by pneumatic clay spades and hand clay knives. Some of the footings were poured directly against the earth banks, while others had to be formed. Part of the earthwork was included in the piling contract and part in the footings contract, but both contractors sublet the excavation to Charles J. Rogers Construction Co., Inc., Detroit.

Piling was concentrated in groups under the column footings, with planned spacings of 2½ to 3 feet in both directions. But some of the piles had to be replaced, and this meant crowding them as much as possible as well as enlarging some of the footings. Original piles were Raymond step-taper steel shells driven with a mandrel and filled with concrete. Some of the replacements were 11-inch steel pipes.

Holes for the piles were precored with a coring machine to a depth of 35 to 40 feet. Piles were then driven to bearing in a tight sand strata, penetrating an average of 55 to 60 feet. This measurement is from the subbasement level, 16.5 feet below the first floor. One of the driving difficulties stemmed from the presence of water under pressure in the sand strata some 50 feet underground. An impervious layer of soil just above the sand apparently sealed off the water, and when this layer was pen-

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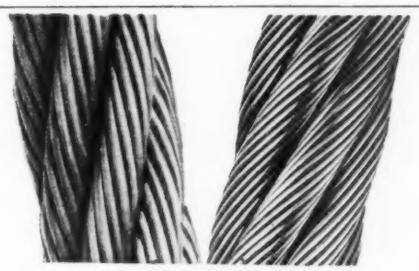

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etrated, the water had a tendency to rise in the holes. Thus if pile shells were punctured or leaked, water and sand flowed in, making it necessary to re-drive or replace the piles. Piles were driven to a minimum of 90 tons end bearing, although the design load was only 75 tons.

Footing sizes and shapes were modified, where necessary, to encompass all the piles in a particular group. In one case as many as 13 out of a group of 30 piles had to be re-driven. In cases like this, the footing had to be enlarged considerably and redesigned to distribute the load properly. Ready-mix concrete for footings was bucketed to the forms by a Manitowoc 3500 crane using a specially designed Heltzel 1½-yard bucket. The crane reached out as far as 65 feet to place some of this concrete.

Three Guy Derricks Set Steel

Structural steel fabricated by Bethlehem Steel Co. at Leetsdale and Rankin, Pa., was shipped to a siding in Dearborn by rail. Here, a Northwest and a Lima crane unloaded the cars and transferred the sections to trucks which hauled to the job site.

Each of the three big guy derricks set up on the building had a 110-foot mast and a 100-foot boom. Thomas two-drum hoists driven by Waukesha gasoline engines through torque converters powered the derricks. Manually-operated bell signals kept erection crews in contact with hoist operators on the first floor as the framework rose.

Columns were fabricated in two-story sections. After each move the guy derricks set most of the columns, giving the structure the appearance of a giant pin cushion. Girders and floor beams were then filled in, and the derricks jumped to the top again to begin another lift.

Bolting and riveting crews stayed about one lift behind the erectors truing up the frames and placing the bolts and rivets in the field connections. High-tensile bolts were used to make about 75 per cent of the field connections on the high steel frame. The remaining connections were mild steel bolted or riveted. On the low frame of the garage and service section, mild steel bolts and rivets were used. Bolts were tightened with Chicago Pneumatic air-operated impact wrenches.

Q-Floors

One of the final jobs for guy derricks as they finished each floor was to bring up the bundles of Robertson Q-floor cellular floor beams. The basic units of this flooring were manufactured at Ambridge, Pa., and shipped by rail to a yard in Dearborn. When they were assembled, sections were trucked to the job in 50-ton bundles containing approximately 50 pieces. Standard sections were 2 feet wide, 18.67 feet long, and weighed 173 pounds. Since special sections were cut at the yard to fit around building columns and other obstructions, no cutting or other fabrication was necessary on the building site.

A small group of workmen opened the bundles and distributed the sections over the floor, sliding them across the steel frame of the building. As the interlocking sections were slid into position, one of the workmen drove a 2-foot-long hardwood wedge into the corrugations of the two pieces to hold them in rigid alignment. Another workman using an arc welder, welded the ends of the pieces to the floor beams and to each other. Welds were made at just two points on each 2-foot section.

The 18.67-foot Q-floor sections were continuous across two bays of the building frame. To permit the floor to be fastened to the intermediate floor beam, circular holes about 2½ inches in diameter were left in the top of every other cell at the midpoint of the section. Working through these openings, a welder attached the bottom of the cell to the beam. Friction caps were later inserted in the openings to keep the concrete or other material from getting into the cells. The space at the top and between the ends of sections which were butted together was closed by a specially shaped closing strip. This was welded onto the sections after the connections were complete. A bank of Hobart welding generators furnished the current for welding.

One of the basic advantages of this flooring is that it provides continuous ducts for electrical wiring or other purposes in every 6 inches of floor. Another advantage, very evident on this job, is that a floor can be quickly covered soon after steel erection crews finish their work. This floor then provides a place for workmen of other trades to carry out their part of the job. Even more important, it provides a strong roof over the heads of workmen below, protecting them from falling objects.

Concrete Construction

Basement walls from footing up to first floor level were formed with Uni-Forms, and the concrete placed by crane and bucket. Concrete for basement floors was chuted directly from ready-mix trucks and finished by Master power float machines and Whiteman mechanical trowels. Concrete encasement for the steel frame of the garage and service building was placed by a Manitowoc 2000 crane using a 1¾-yard Blaw-Knox bucket. The crane bucketed concrete to a Jaeger twin bin on the floor where the pour was taking place, and workmen carried the mix from the bin to the forms in buggies.

Column forms were built of ¾-inch plywood clamped with Universal column clamps. Forms for the beams and floor slabs (Q-floor decking was not used in the garage section) were hung from the steel frame with Dayton Sure Grip and Superior form hangers. Short double 2×4 joists under the beam bottoms were suspended directly from the hangers. These

170 cu. yds. per hour on 1600-ft. cycle

Tulsa contractor averages 170 cu. yds. hourly with TD-24s and B-250 INTERNATIONAL scrapers on 1600-ft. cycle while helping cut 24 per cent off length of Oklahoma highway

The D. W. Falls Construction Company of Tulsa holds the prime grading contract for 7.6 miles of Oklahoma State Route No. 20 between Hominy and Ralston. They were able to make cost-cutting short cuts in earthmoving operations on the project that cut travel distance 24 per cent by using three INTERNATIONAL TD-24 drawn B-250 scrapers moving 27 cubic yard-heaped loads, and push-loaded by a TD-24 crawler.

Take it from Supt. Bob Derington:

"It's really surprising how much dirt these big scrapers will move per day. Under fairly good working conditions, each unit gives me a day-after-day average of 170 cu. yds. of dirt an hour while working a 1,600-foot cycle."

You can get pay-off performance by hitching INTERNATIONAL scrapers to the TD-24—still the Champ of the crawlers with 161 drawbar horsepower. That's the kind of hook-up that loads, hauls and spreads faster than any other combination . . . day after day . . . year after year. Just call your INTERNATIONAL Industrial Power Distributor for demonstration proof. He'll bring the combination you specify anywhere, anytime so that you can see why INTERNATIONALS make every load a payload.

INTERNATIONAL HARVESTER COMPANY
CHICAGO 1, ILLINOIS

INTERNATIONAL
INDUSTRIAL POWER
MAKES EVERY LOAD A PAYLOAD

INTERNATIONAL HARVESTER

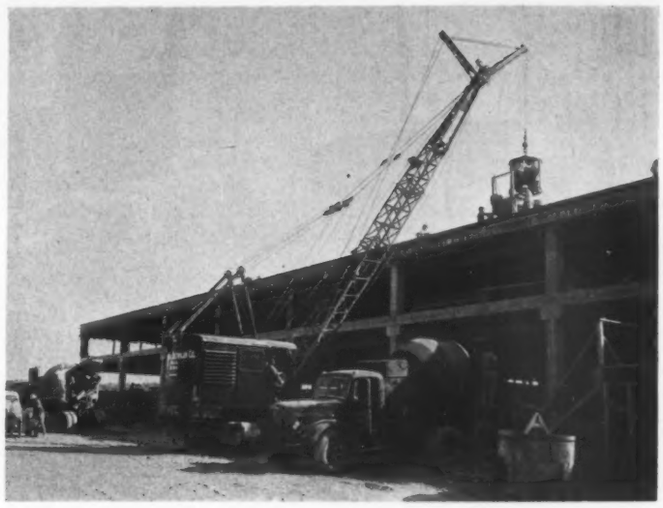
SMOOTH-WORKING TEAM. Four INTERNATIONAL TD-24 crawlers and three B-250 scrapers delivered a total of 510 cu. yds. hourly on the 1,600-foot cycle for D. W. Falls.

joists supported not only the beam bottoms but also the beam side forms, which were plywood backed with 2×4 studs. A ledger nailed to the outside of these studs provided the bearing for the 2×6 floor joists which spanned between the beams. A plywood floor for the slab completed the form. No shores were required with this system.

While concrete was being placed in the forms, Viber electric internal vibrators were used. Additional vibration was provided by holding an air hammer in contact with the steel beams near the point of placement. An Ingersoll-Rand compressor and a Master generator provided air and electricity for the vibrators.

Concrete encasement of the structural frame of the high portion of the building was similar, though floor forms were unnecessary with the Q-floor. Two American tubular hoisting towers more than 200 feet high were set up to deliver concrete and other material to the floors. One tower was equipped with a Thomas electric hoist, and the other had a gasoline-powered hoist. One of the towers was fitted with a concrete bucket and hopper and a materials cage; the other had a materials cage and a Chicago boom.

Crews laying brick and placing the granite slabs on the garage and service section worked from Safway scaffolds. The heavy granite slabs were handled from inside the building by a Ross fork truck operating on the building's floor. A clamp tongs was attached to the top of the granite slab and connected to one arm of the fork truck with a cable sling. The fork truck lifted the slab very gently, enabling the workmen to set it in exact position with a minimum of effort.



A Manitowoc 2000 crane hoists concrete to the third floor level of the garage and service station. Mack trucks with Smith transit mixers discharge concrete directly into the 1¾-yard Blaw-Knox bucket which the crane carries to the pour.

TD-24 POWER FRONT AND BACK PUTS these kinds of 27 cu. yd.-heaped loads in the INTERNATIONAL B-250 scraper in a matter of seconds for D. W. Falls on the company's 7.6-mile project requiring 250,000 cu. yds. of excavation.

EASY, FAST HAULING of heaped loads is assured with this equipment combination. The B-250 scraper requires minimum drawbar pull and has a low center of gravity that gives outstanding stability on side slopes like this.

Sewer and Water Connections

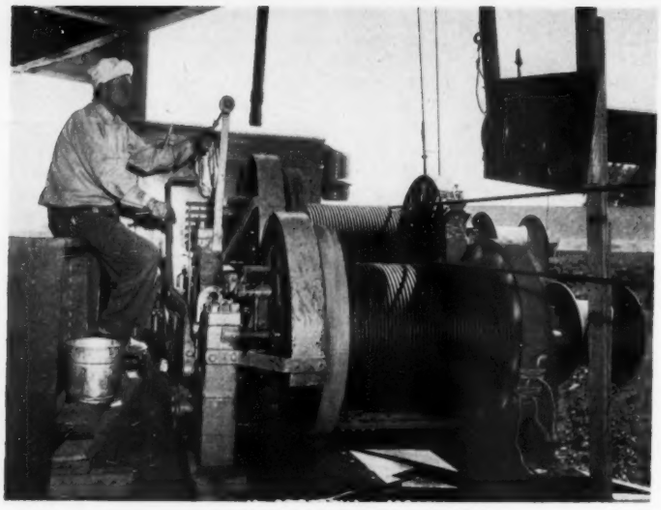
Because it is located well off the streets on a large piece of property, the building required long service connections for storm and sanitary sewers, and for water. A Lima 1½-yard backhoe excavated the trench for the sewers, and a Bay City 65 crane set the 8-foot lengths of reinforced-concrete pipe in sizes ranging up to 54-inch. Tylox rubber gasket joints were used for all sewer-pipe connections. Both storm and sanitary sewers connect to the Detroit sewer systems. Bay City 30 and 45 backhoes dug the trenches and placed mechanical-joint cast-iron water mains. Both sewer and water lines were placed by Page Plumbing & Heating Co., Inc., Detroit, the mechanical subcontractors.

Unique Features

The interior of the structure has been designed to permit a wide variety of arrangements. Exterior columns project beyond the outside wall line, leaving the inner walls in unbroken lines. The 28-foot column spacing across the long dimension of the building is further divided by vertical aluminum mullions to the full height of the building at 4-foot 8-inch centers. The 4-foot 8-inch module, which applies in both directions, permits the floor areas to be subdivided into a number of room sizes and shapes.

Since the entire office section of the building will be air conditioned and none of the windows will open, a special car for window washers will run along a roof track. A scaffold will be lowered and raised at each bay where a guide is an integral part of the intermediate mullions. Rollers on the scaffold at the end mullions will keep the scaffold from marring the skin surface.

On the exterior the projecting columns, which will be 2 feet 1½ inches wide when finished, will be sheathed with aluminum. Exterior walls consist of sash glazed with heat-resistant



On the ground, the operator of the Thomas two-drum hoist receives signals from the signalman by the bell system set up nearby. The Waukesha gasoline engine operating the hoist transmits power through a torque converter.

glass and insulated porcelain enameled panels. The garage and service section, fitted with aluminum sash, will have exterior walls of granite and brick.

Another feature increasing the flexibility of space arrangements is the concentration of all the wind bracing of the structural frame in the center bay. The three bays which make up the narrow dimension of the building are 33.25, 16.67, and 33.25 feet, respectively. Wind bracing in the narrow section will leave ceilings in other sections unobstructed by bracing or large gussett plates.

When the building is completed early next year, the surrounding area will be graded with materials stockpiled during the excavation stage of the job. A parking lot measuring 1,140 × 630 feet and a number of paved roads are included in the plans. Roads will have bituminous or concrete bases and asphaltic surfaces.

Personnel

C. L. William Bloom is resident project engineer for Ford's office of plant engineering, J. A. MacAlarney, director. Supervising the foundation and superstructure contracts for Bryant & Detwiler was job superintendent William F. Hope, who was aided by assistant superintendent E. P. Ellis. President of the contracting firm is R. W. Detwiler. The structural steel was erected under the supervision of C. W. Lowman of Bethlehem Steel Co. H. A. Johnson was field superintendent for H. H. Robertson Co. on the installation of the Q-floor. Jim Gottard ran the excavating and grading operations for Charles J. Rogers Construction Co., Inc. Coordinating the activities of the several prime contractors and many subcontractors was the architect's superintendent, Reinhard M. Bischoff, of Skidmore, Owings & Merrill. THE END

Diesel Generating Set Is Compact Unit

■ A new Sheppard diesel generating set for auxiliary power service has been designed for use where space is at a premium. As such, the Model 17 generating set is particularly suitable for use in cranes, power shovels, draglines, and similar equipment. The generator develops 5 to 7½ kw.

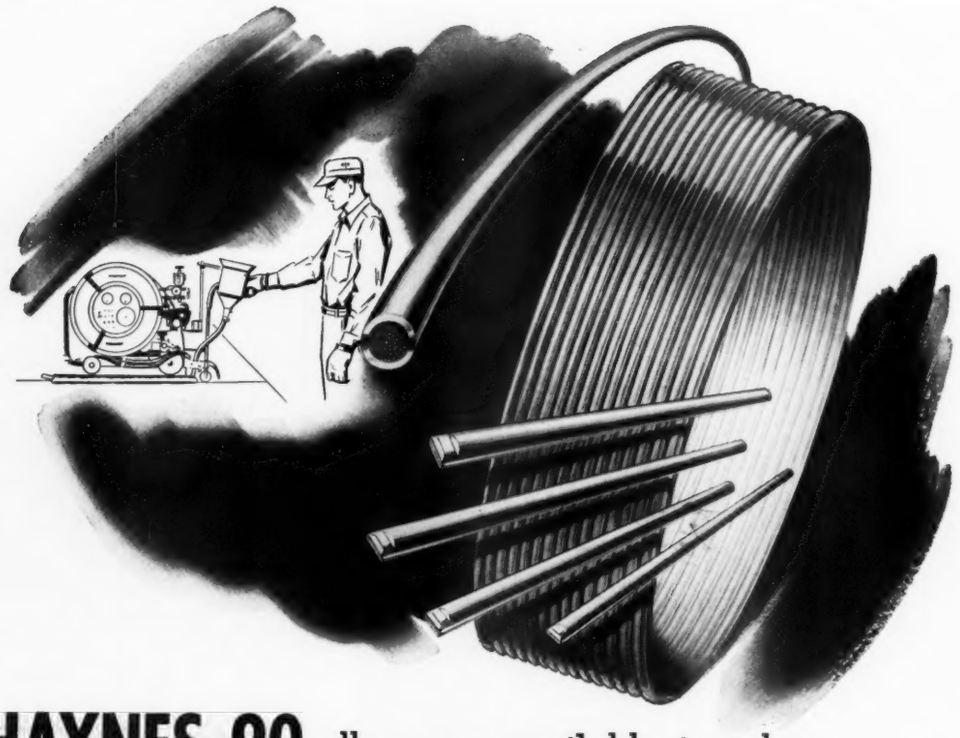
Comparable in size, weight, and price to gasoline-powered generating sets, the Model 17 makes possible the application of diesel power in many places where high initial cost and excessive weight made its use impractical before.

For further information write to R. H. Sheppard Co., 47 Middle St., Hanover, Pa., or use the Request Card that is bound in at page 18. Circle No. 861.

U. S. Rubber Promotions

Three executive appointments have been made by the U. S. truck tire department of the United States Rubber Co., New York, N. Y. H. W. Dodenhoff, with the company since 1948, has been made sales manager of truck tire sales.

J. F. Arthur, the new manager of fleet sales, previously served as truck tire sales manager and as a district manager in Seattle and San Francisco. C. E. Drennen is the new manager of national accounts.



HAYNES 90 alloy now available in tubes and at a MUCH LOWER PRICE

TRADE-MARK

Now you can save even more by hard-facing wearing-parts with HAYNES 90 alloy. This is because HAYNES 90 costs so much less in this new economical tube form. These new tube rods produce sound, uniform deposits that won't crumble or flake off at temperatures up to 1000°F. They provide the same high abrasion, impact, and corrosion resistance—the same dependable protection for your equipment that HAYNES 90 brought to you as a cast rod—and at a much lower price.

For manual hard-facing, HAYNES 90 tube rod comes in convenient 14-in. lengths for easy application with standard metallic-arc welding equipment. For rapid coating of large parts, HAYNES 90 also comes in coils for mechanized hard-facing by the submerged-arc, inert gas, and open-arc methods.

HAYNES 93, HASCROME, and HAYSTELLITE alloys are also available in this economical tube rod form. HAYNES 93 iron-base rod is noted for high abrasion and corrosion resistance . . . HASCROME iron-base rod for high impact resistance . . . and HAYSTELLITE tungsten carbide rod is tops for resistance to severe abrasion.

Your local dealer carries a complete line of HAYNES hard-facing rods. Contact him for complete details. If you don't know the location of your local dealer, write to Haynes Stellite Company, a Division of Union Carbide and Carbon Corporation, Kokomo, Indiana.

See... Your local Haynes Stellite Dealer

— or —

Write... to Haynes Stellite Company

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The Morgen adjustable scaffolding features a triple platform that provides convenient working positions for masons and tenders, with materials placed between them.

Adjustable Scaffolding Features Triple Platform

■ The adjustable masonry scaffolding made by the Morgen Mfg. Co., of Yankton, S. Dak., is now being produced in 19-foot heights in addition to the original 12-foot-high units. This permits its use in the construction of walls up to 22 feet high.

Equipped with a triple platform for masons, tenders, and materials, the Morgen adjustable scaffolding moves up mechanically with the job. The manufacturer emphasizes that the mason is kept at his best working level, and does not have to stop work while the platforms are reset.

For further information write to the company, or use the Request Card at page 18. Circle No. 949.

Pipe-Detector Manual

■ An up-to-date operating manual on the use of pipe-detecting instruments has been released by Detectron Corp., 5528 Vineland Ave., North Hollywood, Calif. Although the manual was written chiefly for the Detectron Model 505, it is said to contain operating hints and data useful for any make of pipe detector.

Instructions in the booklet cover each step of the two main methods used in pipe detecting. A section on detecting unknown pipes describes the use of the pipe detector's transmitter and receiver mounted on a handle as a single unit. The literature also describes the tracing of pipe from a known point.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 842.

Sand-Measuring Magnifier For Soil Analysis

■ An instrument useful in sand and soil analysis, or wherever particles of matter are to be measured, counted, or compared, has been announced by Edmund Scientific Corp., Barrington 3, N. J. This instrument makes it possible to analyze specimens on the spot from which they are taken.

The instrument employs an etched glass reticle which is superimposed directly on the specimen. Both specimen and reticle are magnified six times by a well-corrected triplet magnifying lens. The reticle pattern is designed to show the upper and lower limits of various grain sizes.

A grid scale in the center of the pattern facilitates counting particles per square millimeter or per square 0.2 mm. A clear plastic base admits light to the specimen and the reticle. A battery-powered illuminator is available for examining specimens under poor natural-light conditions.

For further information write to the company, or use the Request Card that is bound in at page 18. Circle No. 873.

Worthington Promotions

Managing the St. Louis, Mo., office of Worthington Corp., Harrison, N. J., is J. H. Loomis, former general line salesman and compressor specialist for the Chicago district office. P. A. Mack has been appointed a special representative for the company.

THE "O'HADI" ALL-WEATHER PATCHER

The practical asphalt maintenance machine.

Heats the hole and the mix simultaneously.

Heats without burning.

Shears the hot patch smooth and level.

FAST — ECONOMICAL — PERMANENT

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Lengths up to 36". Standard diameters from 3/16" to 5". Other diameters up to 8" on special order. Use with standard electric drills or air motors.

FREE FACTORY SERVICING.

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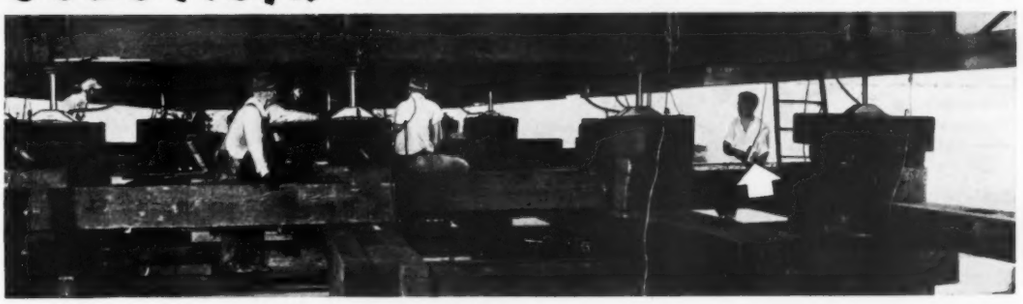
TERMITE ROTARY MASONRY DRILLS

PROBLEM: RAISE A BRIDGE 20 FEET . . .

When this photograph was taken the jacks were suspended (in their supporting blocks) from the bridge deck while the cribbing was raised to the next jacking level.

SOLUTION: RODGERS HYDRAULIC JACKING UNITS!



It isn't often that you have to raise a bridge, but when you do, you'll discover why versatile, powerful Rodgers Hydraulic Jacking Cylinders and Pumps were selected by the Engineering Department, City of Minneapolis, as the safest, quickest and lowest cost method for raising two bridges spanning the Mississippi River. Both structures were raised twenty feet as part of the development of the upper river harbor.

One bridge, consisting of four 200 foot spans and the other, consisting of six 156 foot spans, were raised by lifting one span at a time. To do the job, twenty 50 ton jacking cylinders were placed on cribbing—10 at each end of the span to be raised. An electrically powered hydraulic pump operated the group of ten cylinders at each end. A 13 inch ram travel on the jacks produced completed lifts of an average of 5 feet per 8 hour day, including all cribbing and staying assemblies.

Remote, push button controls permitted the pump operator to go under the bridge where he could watch each lift first hand. The individual pumping source at each end assured absolutely equal lifting force at every jacking point.

Rodgers Hydraulic Jacking Units with hand or powered pumps can be used wherever needed to PUSH, LIFT or PULL. Available in capacities from 50 to 600 tons with standard ram travels from 6 to 48 inches. Ram travels to 72 inches available on special order. Rodgers engineering department will be glad to assist you in the selection of the exact jacking units required for your particular lifting, pulling or pushing job—large or small.

FREE—Complete report on the jacking phase of the bridge raising job described above—written for you by the engineer-in-charge! Ask for Bulletin 327. You'll also want Rodgers free Bulletin 317A. It contains a complete description of Rodgers Hydraulic jacking units, quick couplers, valves and hoses, and a description of hydraulic equipment used in the construction of tunnel shields.

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- For 2 ft. to 4 ft. standard widening.
- 4-speed conveyor belt.
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- Applicable to any standard dump truck.

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The BURCH Road Widener is attachable to any truck. Built-in conveyor, which is driven by heavy industrial gas motor, will deliver material where required. It will handle sand, gravel, stone, or bituminous material. Self-propelled and steered by hydraulic equipment. A high speed unit unexcelled in road construction.

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MANUFACTURERS OF EQUIPMENT FOR CONSTRUCTION AND MAINTENANCE OF ROADS AND STREETS

Introducing the NEW Nelson
B-68
Heaviest • Toughest • Most Powerful
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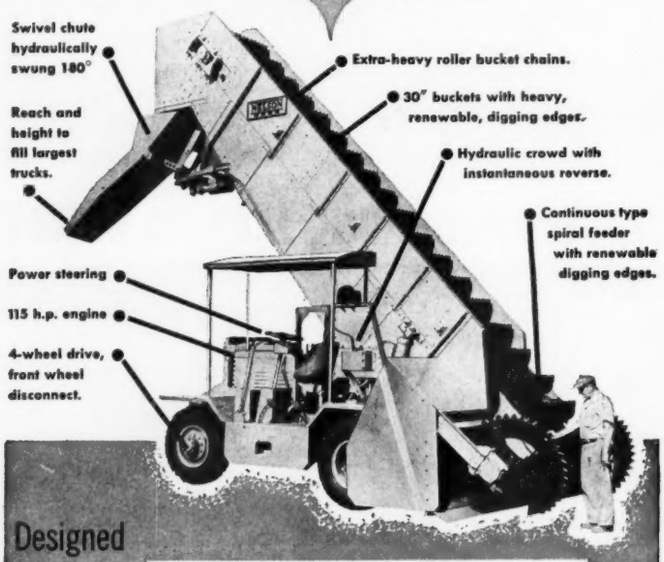
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Reach and height to fill largest trucks.
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MATERIAL FLOWS CONTINUOUSLY from stockpile to truck—the fast, easy, economical way!

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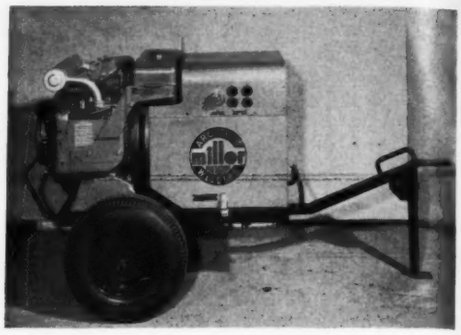

The Miller Model AEA-200-L combination welder and power plant mounted on an optional towing trailer.

Gasoline-Engine-Driven Generators and Welders

■ A complete line of gasoline-engine-driven generators and welders is made by Miller Electric Mfg. Co., Inc. Appleton, Wis.

Models AEA-200 and AEA-200-L produce 200 amps of continuous-rated, high-cycle welding current. They have ample open-circuit voltage for operation of all ac or ac-dc electrodes from 1/16 to 3/16-inch inclusive. Model AEA-200-L also provides 4.5 kw of 110 to 220-volt ac power.

Powered by an Onan two-cylinder, four-cycle gasoline engine of aluminum alloy construction, these units weigh only 435 pounds. Optional accessories include a pull starter, as well as rubber-tire running gear and a towing trailer for portability.

The Miller line also includes a dc arc welder and a combination dc welder and ac power plant. The Model DEA-300 has a three-phase ac generator with separate exciter. The generator output is sent through a special selenium rectifier and supplies from 30 to 300 amp of dc current for welding. The dual model, the DEA-300-L, changes over from welding to power supply with the flick of a switch. The alternator output may be used directly from the generator to provide 60-cycle ac, 220-volt three-phase or 120-volt single-phase power to various loads totaling 10,000 watts.

Also offered is a combination ac arc welder and ac power plant in the 30 to 350-amp welding range. Another ac model is, in addition, a high-frequency unit for Heliarc welding of aluminum, magnesium, etc.

For further information write to the company, or use the Request Card at page 18. Circle No. 882.

MODEL J
Enables you to work close to buildings, driveways, narrow alleys, etc.

HI-WAY SPREADERS SPEED
SEAL COATING OPERATIONS

4 MODELS TO MEET ALL REQUIREMENTS! NEW FEATURES YOU'VE BEEN LOOKING FOR!

HI-WAY Spreaders—with their exclusive combination of engineering features—help you do those *Seal Coating* jobs faster . . . Better! Before you make any Spreader purchase, *be sure* you have the facts on these features of HI-WAY Spreaders.

- Forward and Reverse spreading
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- Simple one-man operation
- Quickly attached and detached
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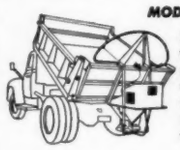
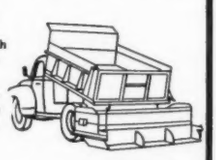
- Interchangeability with different dump bodies

MODEL DD
Can be attached and detached in one minute affording its use with several trucks.



MODEL AS
Equipped with hydraulically operated shutoff gate. Spreads from ½" to 4" in depth.



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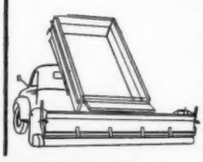
Spreads forward or reverse with control of material flow. Has worldwide acceptance.



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HIGHWAY EQUIPMENT CO., Inc.
616 D Ave., N.W., Cedar Rapids, Iowa
Manufacturers of The World's Most Complete Line of Spreaders and Bulk Material Delivery Equipment

Metal-Cutting Band Saw Mounted on Rubber Tires

Mounted on rubber tires, the Johnson Model M band saw can be taken easily to the stock of metal to be cut.

■ A metal-cutting band saw that is mounted on rubber tires so as to be easily moved by one man is announced by The Johnson Mfg. Corp., Albion, Mich. The Model M saw is capable of handling 5-inch rounds and 10-inch flats. It will cut structural steel, pipes, conduits, angle iron, and reinforcing rods. The machine has vise jaws that swivel 45 degrees for miter sawing.

Powered by a 1/3-horsepower motor available in any voltage, the machine may be plugged into the nearest available outlet. Blade speeds are 45, 90, and 150 feet per minute.

For further information write to the company or use the Request Card that is bound in at page 18. Circle No. 947.

Facts for Engineers About Uses of Rubber

■ A book that discusses rubber as a working tool of the engineer is available from Natural Rubber Bureau, 1631 K St. N. W., Washington 6, D. C. Published in London, the book is intended to familiarize engineers with the characteristics and uses of rubber.

More than half the book is devoted to specific engineering uses of rubber. In the remainder, the sources, properties, manufacture, and testing of rubber are covered.

Copies are available through the bureau at 50 cents each.

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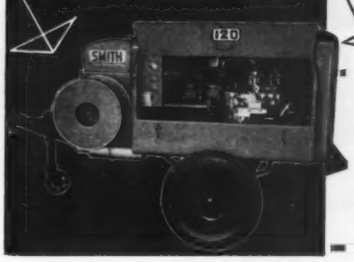

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Send latest literature, prices on Smith 120-P and 75-P compressors.

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CUSHIONED ENGAGEMENT

LIGHT PEDAL PRESSURE
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* The cushioning spring arrangement between the facings in ROCKFORD Spring Loaded CLUTCHES provides cushioned engagement that enables smooth pick-up of the load, without grabbing or chattering. The springs maintain ample pressure to assure the required torque.

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Shows typical installations of ROCKFORD CLUTCHES and POWER TAKE-OFFS. Contains diagrams of unique applications. Furnishes capacity tables, dimensions and complete specifications.

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CLUTCHES

VACU-LUG means LOW maintenance cost!

TOP QUALITY performance!

RELUG WITH VACU-LUG!

Vacu-Lug, the miracle process for renewing traction on worn tires, cuts tire maintenance in half. Yes, you save over half the cost of new tires, regardless of size when your worn ones are relugged by the famous Vacu-Lug Process.

Here is a proven method of traction restoration — tested and approved by U. S. Agr. Dept., laboratories, contractors, and municipalities. These new lugs are applied individually from crude rubber stock and are vulcanized to the tire in a huge steam chamber. What's more important, there is a shop near you ready to give instant service — to reduce down-time to a minimum.

Write for name of Vacu-Lug Shop nearest you.

VACU-LUG PROCESS — Turns the Earth

Tears and breaks in the casing can be repaired at the same time the tires are being relugged. All repair and relugging work are completely guaranteed. Renew power loss — get Vacu-Lug now!

AMERICAN TIRE MACHINERY, INC.
MUNCIE, INDIANA

A new look at road-maintenance methods

This Barber-Greene hot plant owned by the Colorado Department of Highways turns out material which will be stockpiled for use on roads in Section 6 high in the Rocky Mountains. An International dump truck waits to be loaded for the haul to the stockpile. *Ray Day Photos*

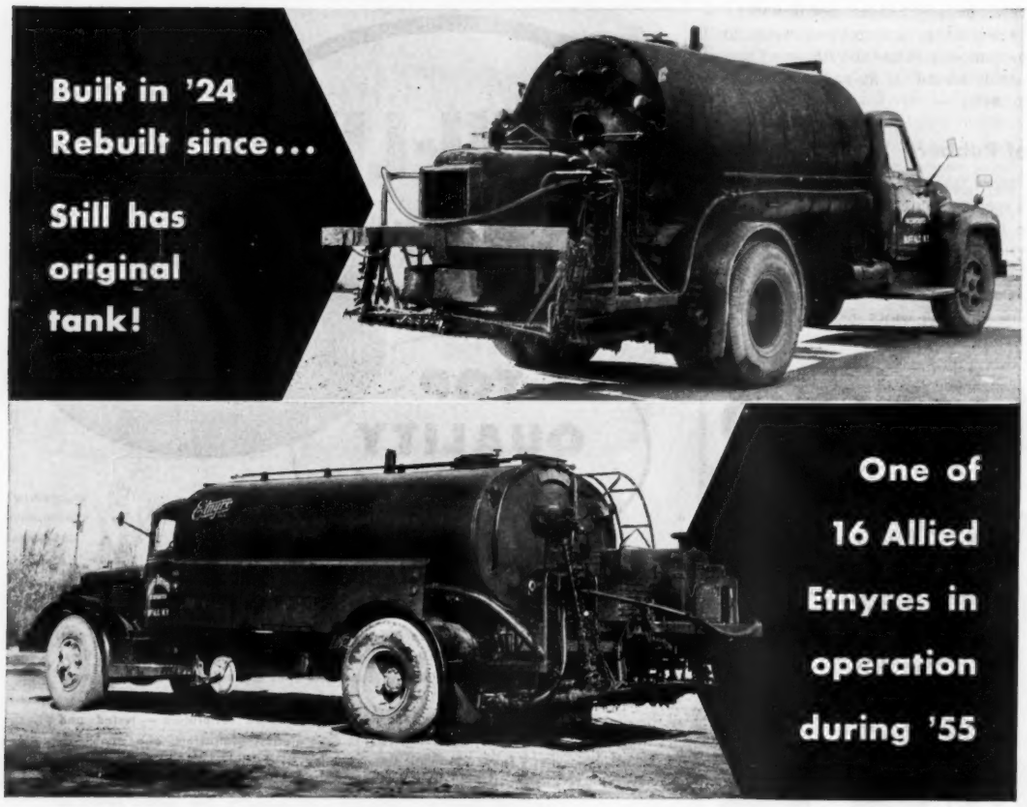
Contractors and others engaged in the building and repairing of highways are forever battling rising maintenance costs. A necessary expense, maintenance nevertheless often adds up to staggering figures. And in the case of state highway departments, which must operate within a set budget, the problem is particularly acute.

Section 6 of the Colorado Department of Highways has discovered that one way to stretch maintenance dollars is to examine traditional methods and then use a little ingenuity in modernizing them. Perhaps it's a matter of strategically relocating storage or repair plants, redistributing repair crews and equipment, or finding maintenance uses for ordinary construction machinery already on hand.

In any case, it is a method that has worked for this highway department section—and will probably work anywhere else. For Section 6, headquartered at Craig, Colo., covers five counties in the highest part of the Rocky Mountains. Here long winters, phenomenal snowfall, heavy summer traffic, and a short work season are the rule, but the section has lowered maintenance costs to $800 a year per mile by this method.

The section is moving its asphalt storage tanks away from the shop headquarters to a location out beyond the edge of Craig, thereby saving on insurance premiums. The new tank system is being set up in a three-tiered arrangement so that gravity dumping is possible. The setup includes an electrical heating arrangement which will free one boiler and a retort for summer road work and save 24 man-hours a day normally required to keep the asphalt hot.

Better methods? The traditional method for painting overhead bridge



Ease and accuracy of Etnyre operation help Allied Bitumens break-in "green" men

What a testimonial! Allied Bitumens, Inc. of Buffalo, New York, was organized twenty years ago. In 1938 the firm purchased three used "Black-Toppers" which had been built originally in 1924 and 1925. Each of these 30-year-old Etnyres has been rebuilt, but the tanks are original . . . and they have never leaked!

According to C. W. Allemeier, Secretary of Allied: "This long life, excellent service, and low upkeep are important reasons why we continue to buy Etnyres." Including two new Etnyres delivered in 1955, the Allied fleet now consists of sixteen "Black-Toppers."

As Mr. Allemeier points out, his is a seasonal business, requiring the annual break-in of many new drivers. This problem is simplified by the ease and accuracy of Etnyre operation.

With experience like this to guide you, why put up with anything but the very best in distributing equipment? Contractors everywhere agree that you'll turn out better jobs, in less time, at lower cost with Etnyres. Get all the facts — see your nearby Etnyre Dealer, or write E. D. Etnyre & Co., Oregon, Illinois, U.S.A.

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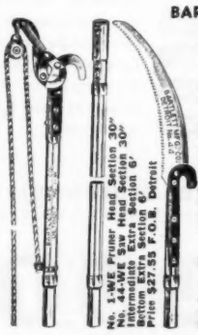
"Black-Topper"
BITUMINOUS DISTRIBUTORS


No. 1-WE Pruner Head Section 30"
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Intermediate Extra Section 6'
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WE Combination Pruner and Saw
EASILY CARRIED IN SMALL CAR

Length	Weight
30 in. Pruner	2¾ lbs.
30 in. Saw	1½ lbs.
72 in. Section	2 lbs.
72 in. Section	1¾ lbs.

This combination can be quickly and easily assembled to make either of these two tools:
1 Heavy Duty Tree Trimmer (1¼" capacity) 14½ ft.
1 Fast-cutting Pole Saw 14½ ft.
If other lengths are required, specify extra sections 4 or 8 ft. long, to make the necessary length.

trusses requires a block and tackle, a boatswain's chair, and ladders. The problem is to keep traffic from interfering with the paint job, and vice versa. Section 6 has rigged a tight-fitting platform up from the sides of the body of a standard dump truck, so that the painters can work anywhere up to 25 feet off the ground rapidly and safely. The truck driver, incidentally, becomes one of the flagmen to control traffic.

Efficiency improvement? There are examples of this, too. Much of Section 6's equipment has to work at altitudes of between 8,000 and 11,400 feet. By replacing the gasoline engines with diesels in most of the heavy trucks and all the rotary snowplows, section officials boosted the performance characteristics of that equipment by as much as 40 per cent. They know definitely that a diesel-engine-equipped rotary snowplow will move about 40 per cent more snow on one of the high passes than the same machine did with its original gasoline-powered engine.

Big Division

Section 6 comprises a huge maintenance division. Covering five counties and part of a sixth, the section is responsible for the maintenance of about 800 miles of highway, including both transcontinental and secondary routes.

Until January 1, 1954, the section was responsible only for the maintenance of primary state highways within its borders. In 1953, however, the Colorado state legislature made legal provision for the State Highway Department to take over the maintenance of considerable mileage of secondary roads formerly maintained by the counties. Section 6 was as much a victim of that move as any other maintenance section of the Colorado Highway Department, and 1954 saw quite a change in its over-all maintenance approach.

In Section 6 the approach to this change has been typical of the way the outfit goes about its job. Where county highway department offices have been considered inadequate to do the improved job called for by Colorado's legislature, the section has assumed its new maintenance responsibility without question. Some of the county road departments, however, had excellent crews and good equipment and were well organized to do the necessary maintenance job. A logical business move was to renegotiate with these public agencies a form of inter-governmental contract by which a county would do some of the secondary maintenance for the State Highway Department, and be reimbursed for its time and trouble. Under this type of business arrangement, Rio Blanco County is maintaining 83 miles, Routt County is maintaining 67 miles, Jackson County has 107 miles, and Grand County is maintaining 49 miles. The remainder of the 800-mile system is being maintained by Section 6 crews and equipment.

Patrol System

Section 6 uses a patrol system of maintenance, under which a patrolman and a patrolman's helper are responsible for sections of highway from 22 to 40 miles in length. It's their job to patrol this mileage regularly, to spot incipient trouble, and to make routine maintenance repairs. The patrol system, however, is considerably more flexible than these statements indicate. There is a 22-mile patrol section, for example, on Rabbit Ears Pass. The pass is one of the most troublesome as far as snow removal is concerned, and frequently during the worst winter months it is necessary to boost the Rabbit Ears patrol to as many as 14 men. Special crews, extra men, and standby equipment always are available to move in and augment any patrolman or his helper whenever there is work to be done. In no case, however, is a patrol ever overstaffed.

Ordinary equipment for a patrol consists of a four-wheel-drive truck with snowplow and wing attachments, a light loader, a light truck, a motor grader, a mowing machine, a weed sprayer, and asphalt patching equipment. The allocation of this equip-

Hauling 1½ miles on narrow, slippery roads, Tournapulls must maneuver around draglines, tractors, and other equipment. Big 4-wheel air brakes and positive power steer permit safe use of high haul speeds. Tournapulls are taking fill from underpass excavation to overpass fill while draglines muck out another section.

D. W. Winkelman

speeds $8,973,000 section

of Ohio Turnpike

Doubles Tournapull fleet to lick long hauls, hills, rain, and traffic

With 3,340,000 cubic yards to move on a 10-mile section of the Ohio Turnpike near Pennsylvania, D. W. Winkelman Co. Inc., Syracuse, needed equipment that could work well under difficult conditions.

These conditions included tough-loading material — mostly shale, clay, and gumbo — plus lots of rain.

Puts 12 "C's" and 3 fast rubber-tired tractors to work

To complete the $8,973,238 job in the shortest possible time, Winkelman drove in a fleet of 6 C Tournapulls from the New York Turnpike, doubled this with 6 new "C's" to make it a Tournapull dozen. They also brought 3 of their rubber-tired Tournatractors to the job site near Youngstown. These were used to speed push-loading, dozing, and scattered tractor jobs.

The Tournapulls usually were pushed by a 175 hp crawler. Each side-boarded "C" regularly loaded 13 pay yards of sticky, wet clay in 150 to 200 ft. In spite of delays caused by the rain-soaked footing . . . plus delays for highway traffic and slowdowns for other equipment crowding the narrow winding haul load . . . cycles of 16,500 feet took only 21½ minutes.

"C's" do the tough jobs

This outstanding performance was nothing new to the Winkelman organization. As is true in construction work all over the country, they always have assigned Tournapulls to move earth where conditions were toughest. Their records show Tournapulls outperform others on the following assignments:

Slippery mud — Tournapull's automatic power-transfer differential shifts power to wheel on firmer footing — allows the units to "walk" out of the mud.

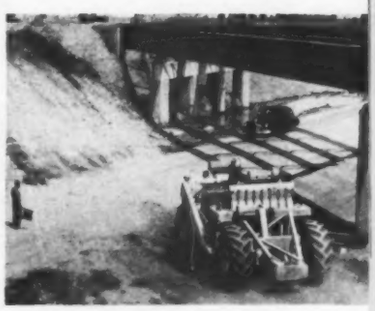
Long haul distances — The "C's", with a top speed of 30 mph, continually post good records on both short and long hauls. Big, low-pressure tires roll over paved roads or cross-country with equal ease.

Close quarters — Fingertip controls and 15' turn radius make "C's" a "natural" for work in tight spots where competitive self-powered scrapers often cannot even go.

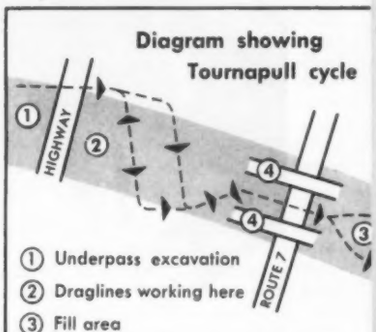
Emergency service — Here's one typical example! One of the big cranes on this job was slipping in soft mud. "C's" carried in several loads of dry earth . . . built up a suitable working base for the crane . . . returned to production earth-moving in a few minutes.

Ask for more information

Compare all the facts. We believe you'll quickly see why LeTourneau-Westinghouse owners have the best insurance for profits when competition gets tough.



Another part of haul takes Tournapulls across busy Route 7. Units travel here down 200' of 7% grade, across pavement, then up 7% grade. Haul speeds averaged 10 mph for entire 3-mile cycle, despite numerous adverse grades and slowdown to cross two highways.



Tournapull—Trademark Reg. U.S. Pat. Off. Tournatractor—Trademark PT-725-H-b

LeTourneau-Westinghouse Company

PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

G. K. Cummings, superintendent of maintenance at the Section 6 headquarters shop at Craig, Colo., stands in a yard filled with mobilized equipment.

(Continued from preceding page)

ment is controlled from the central headquarters at Craig, so that idle equipment cannot be tied up by any patrol.

A number of special-purpose machines are available to augment these spreads. These include such equipment as Snogo and Bros rotary snowplows, assigned permanently to some of the worst high mountain passes. Section 6 also has a pair of floating rotary snowplows, which can be based at Craig and allocated immediately to any trouble spot. The section owns its own Barber-Greene asphalt plant for turning out pre-mix or hot-mix material. It owns two large shovels for alignment changes and slide cleanup. It uses a Barber-Greene Mixall to excellent advantage. It has a Warner & Swasey Gradall and literally dozens of motor graders.

Equipment Use

The use of equipment is determined by weather conditions, since Section 6 is at such a high altitude. As a general rule, December 15 sees the entire section fairly well snowed under for the winter. And even in the lowest elevations, the spring breakup cannot be expected much before March 1. At high altitudes, snow removal is a problem at least until May 1. From December 15, therefore, until the spring breakup, the maintenance job consists primarily of snow removal and the repair of major equipment units in the Craig headquarters shop.

First priority, following the spring breakup, is given to the prompt repair of all major highway surfaces—including the stabilization of any bad bases. A lot has been accomplished along these lines during the last 6 years. There was a time not so long ago when most of the roads in Section 6 consisted of old road-mix type of pavement with poor bases. As late as 1948, trucks were getting stuck in the middle of the highway during the spring thaw. This condition has been largely corrected by maintenance crews, who dug out the old subgrades and re-established strong stabilized granular bases before putting on plant-mix surface courses. Much spring patchwork is done either from pre-mixed MC3 stockpiles left over from the fall or by direct application from the Barber-Greene portable hot plant owned by Section 6. For small spot-patch jobs, the Barber-Greene Mixall has been almost indispensable because of its portability.

Surface repair gradually blends into routine summer jobs: weed mowing, chemical weed control, major surface-repair work with bituminous mixes, and even grade and alignment changes.

Long before maintenance crews are ready, autumn hits the high country and it almost always crowds such items as center striping, placement of guard poles, and replacement of signs.

More and more erectors are turning to high-strength steel bolting of structural joints. Bolted connections can be made faster, quieter and with far less man power. High-strength bolts afford greater clamping force and stronger joints than ever before possible.

Key to this successful new method is the Chicago Pneumatic Air Impact Wrench. Easy-to-handle CP Air Impact Wrenches are powerful, fast, and smooth. Safe . . . with no dangerous torsional thrusts. They're reversible . . . ideal for removing fitting-up bolts in pre-assembly work. Furnished with side, pistol grip or straight handles. Angle-head models for reaching awkward, hard-to-get-at spots. For more details write *Chicago Pneumatic Tool Co., 8 East 44th St., New York 17, N. Y.*

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PLAY SAFE! ASK FOR A DEWATERING ANALYSIS BY

GRIFFIN WELLPOINT CORP.

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CONTRACTORS AND ENGINEERS

This working platform, erected on the body of an International dump truck, enables bridge-painting crews to work up to 25 feet off the ground without disturbing traffic on the bridge. The rig replaces the old boatswain's chair.

Due to heavy snows, the replacement of signs is a big job. Section 6 has worked out some modifications on striping, too, to bring that operation more in line with current demand. For example, the Craig shop developed its own striping machine, which also is being used in counterpart by the Grand Junction Section. Both areas have the same climatic conditions.

Air agitators on ordinary striping machines lacked power for the job Section 6 has to do. During some of the cold fall months, when paint striping must be done, the air agitators wouldn't even stir the paint, let alone the mixed-in type of reflective beads which Section 6 uses because they resist snowplow blades so much better than the poured-on type of bead. The Craig striping machine now has a power agitator run directly from the truck takeoff, and geared down through a 25 to 1 reduction. That gives plenty of power to agitate paint and beads, and the machine frequently does 25 miles in an 8-hour shift.

Bridges

The bridge problem is another phase that's being changed radically. A major study of bridges in the section, along with the hydraulic characteristics of their streams and watersheds, was made, and the result was the astonishing discovery that the section had many bridges it didn't really need. Many of the bridges had been grossly overdesigned as to hydraulic characteristics, but had been grossly underdesigned as far as carrying modern highway traffic was concerned. One bridge replaced last summer had wooden stringers on 39-inch centers. In the past two years, ten major bridge structures have been eliminated—five by maintenance forces and five by contractors. These bridges have been replaced by Armco culverts in whatever size has been necessary. The largest culverts installed by maintenance forces have 84-inch Armco Multi-Plate pipe just long enough to reach through an embankment.

Still another businesslike move has been made in the field of crushed-rock production. Although Section 6 owns its own rock-crushing equipment and keeps it busy practically full time, its management also has been quick to take advantage of rock-plant setups made by contractors. A contractor's rock-crushing plant on a new construction job in Section 6 presents a marvelous opportunity to obtain a stockpile of crushed material at very reasonable cost. Such purchases of material are negotiated so regularly that the district's hot plant can be worked every day that weather will permit.

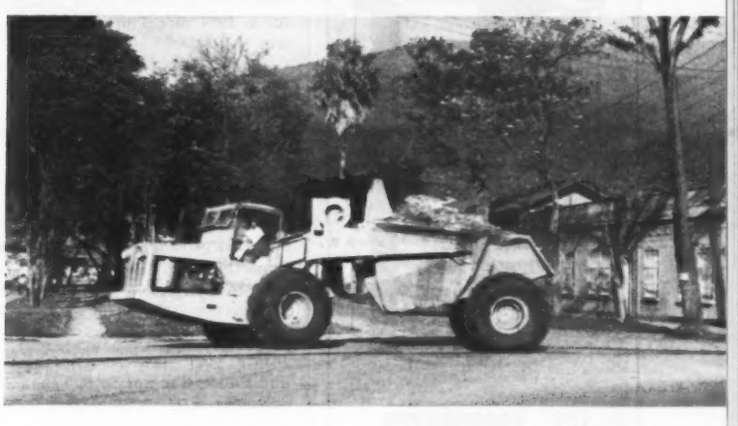
In the 1954 work season the section used 400,000 gallons of asphalt by September 15 for maintenance alone. This consisted largely of MC3 for pre-mix and upper-deck work, with RC3 cutback being used for seal-coat work. Only three carloads of MC0 had been purchased, largely for priming.

Snow Removal

Snow removal still remains Section 6's biggest problem. Subzero temperatures, staggering snowfalls sometimes totaling 80 feet a season, and the necessity for keeping highways open all seasons of the year, have combined to make it a problem of first magnitude. In the highest mountain passes, where highways reach an elevation of 11,315 feet above sea level, there's the problem of heavy continuous snow, bad slides, and extremely low temperatures. But, ironically, an even worse problem exists for Craig on the plains west to the Utah state line, where high winds and drifting conditions complicate matters. In 1948 a sustained 6-week blizzard in this section created one of the worst snow problems Colorado had had for years. It was a job for push-plows, for V's, and for every rotary in the district. Maintenance men remember one bitterly cold Sunday morning when four of the dis-

Through a river in Colombia . . .

Through a city of 237,000 . . .



Tournapull Rear-Dump hauls gravel for new stadium

In the city of Medellin, Republic of Colombia, this 18-ton Tournapull Rear-Dump travels a difficult route while hauling construction materials to the new municipal stadium.

First, the Rear-Dump is driven through water 1.6 to 2.6 ft. deep to be loaded with river-run gravel and sand needed for the stadium's concrete construction. Water often covers rig's undercarriage during these trips, but this has not harmed, or even affected, the electrical control system or brakes. Despite this loading in water, in more than 2,000 hours of service, machine has needed practically no repairs.

Once out of the river, haul road leads through Medellin, a city of 237,000 people. Easy maneuverability and powerful four-wheel air brakes allow Rear-Dump to drive along busy thoroughfares without delaying normal traffic or endangering other vehicles. Rear-Dump has traveled city streets for two years, and has never been involved in an accident.

Whenever you have earth to move, investigate the many advantages offered by modern LeTourneau-Westinghouse equipment. Ask your local Distributor to give you facts and figures on the size Tournapull Rear-Dump you need — 9, 18, 35, or 50 tons. He is always at your service.

Here's what city officials think of their Tournapull Rear-Dump

Dr. Jorge Ortiz Rodriguez
Mayor, City of Medellin

"We are satisfied with our Tournapull which has given us uninterrupted service for approximately two years. Cost of operation is so low that we are considering purchase of an additional unit. Safety feature of the 4-wheel air brakes permits use in our city without danger or interruption of traffic flow."

Dr. Alberto Puerta-Puerta
Chief Engineer, City of Medellin

"Tournapulls and their ability to operate in wet conditions, such as river bottoms where they can obtain large loads of heavy, water-filled pit-run gravel and sand, have proven to be one of the solutions to our problem in Medellin. Maneuverability and radius of turning is a great factor of safety for haulage through the city."

Dr. Francisco Eladio Gomez
Director of Purchases, City of Medellin

"Under conditions of haulage through river bottoms in water, and heavy loads of gravel and sand, consumption of spare parts and tire replacement have been astoundingly low. Little or no troubles have been experienced with electrical mechanisms, and operators are satisfied with the machine."

LeTourneau-Westinghouse Company

PEORIA ILLINOIS

A Subsidiary of Westinghouse Air Brake Co.

Tournapull—Trademark Reg. U.S. Pat. Off.R-383-8-b

trict's rotary snowplows were in the shop for repairs—and roads were blocked three directions from Craig. During that hectic time the shop was on a 24-hour schedule. and maintenance men worked practically for months without adequate rest.

Of late years, snowslides have been an increasing hazard, but in all new road construction, backslopes are being established to give as much snow-disposal room as possible. On the flat lands, the embankments are being built up several feet higher than the surrounding ground so that the wind can help in disposing of the snow.

Replacement of the gasoline engine in rotary Snogo plows with Cummins diesels has increased the capacity of these machines as much as 40 per cent. Section 6 also is using a type of truck mounting for the rotary plows which gives all-wheel drive and all-wheel steer and helps prevent rotaries from becoming stuck in their snow banks.

All snowplows and other equipment get major repairs in the central headquarters shop at Craig. The large modern shop has room for the repair of about five to seven of the biggest pieces of maintenance equipment at one time. It is steam-heated, has a full-traveling crane, and is well organized.

The shop has a paint room, heavy equipment repair base, a motor repair shop, inside and outside washrooms served by a Kerrick Kleaner, and plenty of storage space for spare parts. Because of the extremely short summer work season, the winter repair of all major equipment items is an absolute must; so by late summer trained mechanical inspectors are looking over the equipment to order whatever spare parts are necessary.

By devising better equipment where necessary, by making changes in standard models, and by changing maintenance methods entirely as in the case of bridges and paint striping, Section 6 is making real headway in gradually building a better transportation network. The 1954 maintenance allocation—it included all funds for county-maintained roads and some money for betterment projects—was $651,000. That amounts to just slightly over $800 per mile, which is considered quite reasonable for a 1954 model primary road system.

Personnel

Ralph McCoy, district engineer at Grand Junction, has general supervision of maintenance in Sections 6 and 2. G. K. Cummings directs maintenance at the Craig shops. Mark U. Watrous is chief engineer and chief administrative officer of the Colorado Department of Highways, with offices in Denver. THE END

Insure your own personal security and that of the nation by regular investment in U. S. Defense Bonds.

Improved Dual-Axle Drive Unit for Six-Wheel Trucks

■ A new dual-axle drive unit for tandem-axle six wheel trucks has been announced by The Truckstell Mfg. Co., Union Commerce Bldg., Cleveland 15, Ohio. This dual drive consists of a combination of the Truckstell three-speed power divider and a specially designed suspension.

The new suspension offers truck operators three advantages. Since it requires no lubrication, it is less susceptible to damage resulting from neglect. In addition, specially-designed spring housing beams, steering torque rods, and rubber-bushed radius rods align all driving wheels on the straightaway and guide and control them on curves and contours.

A third feature of the suspension is a new spring arrangement. Spring leaves are encased in a closed spring housing box and carried in upper and lower stages. Under light loads only the top stage is used, eliminating the hard ride heretofore associated with trucks running empty. When the truck is fully loaded, both stages supply a support of 36,000 pounds tandem-axle rating.

The Truckstell three-speed power divider transmission system included in the drive provides a positive axle-drive selector and three-speed auxiliary gearing. Drive is positive at all times. No interaxle differential or extra auxiliary is required.

For further information write to the company, or use the Request Card that is bound in at page 18. Circle No. 817.

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Make an IGLOO water cooler standard equipment for your construction crews! You can't match a sturdy Igloo for toughness and durability. Its fully-corrugated, all-steel galvanized construction outlasts—and out-cools—the old-time water barrel by years. Put an Igloo on the job—it's the world's *best* portable cooler!

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Your CARVER DISTRIBUTOR can also supply you with Diaphragm Pumps and a full line of high pressure Jetting Pumps. See him today.

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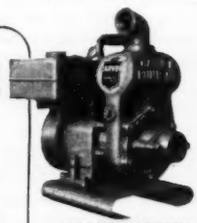
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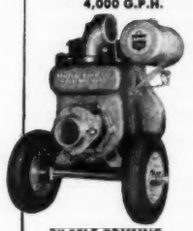
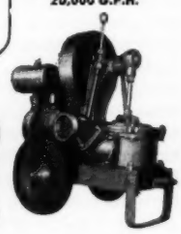
4,000 G.P.H.


3" SELF-PRIMING
20,000 G.P.H.


4" DIAPHRAGM PUMP
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CARVER
the quality name in pumps

BLACKHAWK *Trench Hog*

A low cost, mobile, versatile, trencher

A Ford or Ferguson tractor mounted, versatile, small trencher with big trencher performance, digs up to 800′ per hour, with wide range of depths and widths — up to 7′ deep, 20″ wide. One man and a Trench Hog do the work of 40 hand laborers. Ideal for builders, plumbers, electrical contractors, utilities, municipalities and pipeline contractors.

- Depths accurately controlled, hydraulically.
- Cutters furnished in 6″ to 20″ widths. Easily changed to suit the job. Special cutters for tough soils and frozen ground.
- Optional equipment includes one side dirt delivery attachment to deposit spoil on either right or left side of trench.
- Crumbers available to provide clean, smooth, accurate trench bottom.
- Choice of 7 digging speeds.
- Independent wheel control for straighter line trenching and turning corners.
- Boom raises upward about 90° for transport.
- 4′ bulldozer available for backfilling.

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The Fluomatic drive brings the advantages of the fluid torque converter to engines rated at less than 10 hp. ►

Fluid Torque Converter For Small Engines

■ A fluid torque multiplier for gasoline engines or electric motors under 10 horsepower has been announced by Little Beaver Industries, Willoughby, Ohio. The Fluomatic drive is reported to eliminate shock starting or stopping and to give easy power takeoffs on intermittent or power loading.

The Fluomatic unit, completely self contained, consists of a turbine, reaction member, and pump in an aluminum housing. Its total weight is 27½ pounds.

The manufacturer reports that the Fluomatic has been used successfully on screw conveyors, winches, and hoisting devices. In such applications it allows the engine to reach full speed and horsepower regardless of the load. Used with a multiple bank of electric motors, it eliminates the need for electronic synchronization.

For further information write to the company, or use the Request Card at page 18. Circle No. 811.

Catalog Recommends Scaffolding Methods

■ A scaffolding catalog from Universal Mfg. Corp. provides layout and engineering information of interest to masonry, construction, and maintenance contractors. It shows how to economize by single-bracing scaffold runs and illustrates the Gravity-Lock feature of Universal scaffolding which eliminates bolting on most jobs. It also describes Ezebilt scaffold panels and work-saving accessories and shows the proper methods for safely erecting scaffold towers and for shoring concrete slabs.

Other products covered include Universal's Endlock pipe-and-clamp scaffolding, adjustable steel post shores, ledger brackets, heavy-duty sidewalk bridging, and the recently introduced Ladscaf ladder-panel scaffolding.

To obtain this literature write to the Universal Mfg. Corp., Zelienople, Pa., or use the Request Card at page 18. Circle No. 948.

Technical Information On Wrought-Iron Pipe

■ A manual containing technical information on wrought-iron pipe has been announced by A. M. Byers Co., Clark Bldg., Pittsburgh 22, Pa.

Tables list size and dimensional data of Byers wrought-iron pipe and tubular products. Data is also provided on wire and sheet-metal gages.

Supplementing the tables is information about wrought-iron's physical characteristics and special properties, specifications of technical societies, mill standards, identifying markings, and ordering procedure.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 812.

Selection Guide for Multiple V-Belt Drives

■ A selection guide for multiple V-belt drives has been issued by Fort Worth Steel & Machinery Co., P. O. Box 1038, Fort Worth, Texas. The guide uses new horsepower ratings and improved rating techniques adopted by the Multi-V-Belt drive and Rubber Manufacturers Associations.

Simplified formulas for standard quarter-turn and V-flat drives are augmented by tables of drives in all belt sections. These have been compiled for quick selection of drives of required ratios and speeds. The bulletin also contains engineering information on other types of V-belt drives.

To obtain Guide No. 50-B write to the company, or use the Request Card at page 18. Circle No. 912.

ON-TIME MAINTENANCE REDUCES DOWN TIME EXPENSE

HOBBS HOUR METERS tell you at a glance when protective maintenance is due — the essential services that lengthen the life of your equipment and reduce repairs.

Not a Revolution Counter

The HOBBS HOUR METER is an electric timing instrument that shows HOURS and MINUTES of engine operation — important accuracy that no revolution counter can provide. It records running time on all types of powered equipment — stationary or mobile . . . gasoline or Diesel.

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Installed as original equipment or recommended as an approved accessory by leading construction equipment manufacturers. Ruggedly built . . . easy to install. See your factory branch, representative or distributor . . . or WRITE:

HOBBS Engine Hour METERS

New and improved through continuing engineering research

John W. Hobbs Corporation
2067 YALE BLVD. SPRINGFIELD, ILLINOIS
World's Largest Builders of Running Time Meters

4 LEBUS BINDERS HOLDING 158,000 lbs.

Pictured is a portion of a 158,000 pound vessel being transported by the Musselwhite Trucking and Rig Building Company. Shown here are two of the four LEBUS LOAD BINDERS used to hold this load . . . further proof that truckers depend on LeBus Load Binders for STRENGTH, SAFETY and REAL HOLDING POWER when transporting valued loads. Make it a safe load . . . bind it with LeBus Load Binders!

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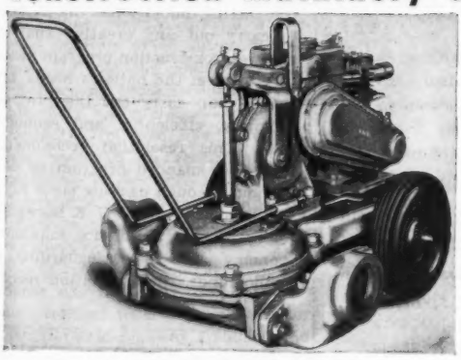
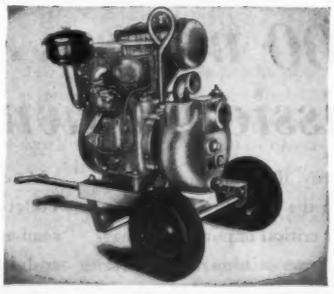
Two revolutionary new pumps announced by Construction Machinery Company, Waterloo, Iowa





A NEW TYPE VARIABLE-SPEED, VERTICAL-STROKE PLUNGER that assures a much longer diaphragm life and greatly increased efficiency, is a real money-saving feature of CMC'S new SKWEE-GEE diaphragm pump.

A combination 2" and 3" pumper, the SKWEE-GEE is now the best pump in the business for jobs ranging from de-watering to pumping sludge. Can't be beat for high suction lifts, seepage control, small well-point de-watering jobs.

SKWEE-GEE primes dry at 25 feet. Provides total heads up to 40 feet. Standard plunger stroke 3" with alternate 2¾" by simple adjustment. Briggs air-cooled engine.

Write for Bulletin FD-L3-55. **Construction Machinery Company,** Waterloo, Iowa.

TWICE THE PRESSURE of ordinary single impeller pumps is delivered by CMC'S new and different 2-stage dual primer, Model TS-7.

A 1½" pumper with unique type impeller, it's excellent for such jobs as pumping through extended lines and washing equipment. Fine for suction lifts up to 25 feet.

Write for Bulletin TS-7, **Construction Machinery Company,** Waterloo, Iowa.

A Complete Line of Dual Primers from 1" to 10"

AGC speakers predict construction boom era

In sharp contrast to last year's tone of cautious optimism, the 1955 annual convention of the Associated General Contractors of America, Inc., struck a note of clear confidence in a continued high volume of construction activity. More than 2,000 persons attended the association's 36th annual meeting, held March 14 to 17 at the Roosevelt Hotel in New Orleans, La.

Outgoing AGC president John MacLeod, speaking at the opening session, predicted that new construction this year would reach the $40 billion mark. With an estimated $16 billion in maintenance and repair work, the total for the year should amount to about $56 billion, he said. The nation's construction volume last year reached an all-time high of $52 billion, and of this amount $37 billion was in new construction and $15 billion in maintenance and repair operations.

While predicting that the volume of new construction would continue to grow, reaching the $60 billion figure before many years, MacLeod cautioned that "we must take seriously our responsibility . . . so that the public receives increasing value for its investment in construction."

In the succeeding days of the convention, other speakers voiced predictions similar to MacLeod's. Among the prominent speakers were James Wilson Newman, president of Dun & Bradstreet, Inc.; Rear Admiral J. R. Perry, chief, U. S. Navy Bureau of Yards and Docks; Brig. Gen. D. H. Tulley, assistant chief of engineers for military construction, U. S. Army Corps of Engineers; and W. A. Dexheimer, commissioner, Bureau of Reclamation, U. S. Department of the Interior.

In committee sessions, delegates echoed their confidence in the continued prosperity of the construction industry, and in their own ability to continue advancing toward better, safer, and more efficient and economical operations.

New Officers Installed

Newly elected officers and directors were installed at the closing session. President this year is George C. Koss, Koss Construction Co., Des Moines, Iowa, who succeeds John MacLeod, Macco Corp., Paramount, Calif. Vice president is Frank J. Rooney, Frank J. Rooney, Inc., Miami, Fla. William Muirhead, Durham, N. C., was re-elected secretary-treasurer. H. E. Foreman is managing director of the association, and J. D. Marshall, executive director. Officers for 1955 were elected in January by a mail ballot of the 6,517 association members.

Resolutions adopted by the convention reaffirmed the association's position favoring the contract method as opposed to day labor for all private and public construction. A resolution relating to collective bargaining recommends that demands for increased wage rates and welfare benefits be resisted to the fullest extent. Relative to the Davis-Bacon Act and the 8-hour laws, the convention recommended no extension of the provisions to federally-aided projects, such as federal-aid highway construction.

On the subject of highway construction, a resolution was adopted assuring the public that the highway contracting industry has the capacity to carry out any greatly expanded highway construction program necessary to meet the nation's needs, and that it can carry out the program promptly, efficiently, and economically. This resolution recommends that the expanded program be carried out through existing state highway agencies and the U. S. Bureau of Public Roads. To assure maximum economy and the safeguarding of public funds, the association recom-

With Fuller Model 10-A-1120 Transmissions in fleet of 23 Autocars, Allegheny Construction Equipment Company is getting more work time, less downtime through the right gear ratios to meet load and grade, with shorter, easier shifts that help provide faster work cycles.

300,000 miles . . .
no transmission downtime

Allegheny Construction Equipment Company of Pittsburgh, Pa., select their trucks and truck components with profitable operation in mind.

Today, a fleet of 23 Autocar dump trucks is rounding out its fifth year for Allegheny Construction. The trucks are powered by 165 hp diesels working through Fuller 10-A-1120 Transmissions. Already, many of the trucks have topped the 300,000-mile mark . . . *with no transmission downtime.*

Allegheny, like other leading contractors in the construction industry, knows the critical importance of having *correct transmission ratios to meet heavy loads and adverse grades . . .* under *severe operating conditions . . . and controlled by short, quick, easy shifts.* They specified Fuller Transmissions to get correct ratios and long life in their Autocars. *That's why more equipment owners and users specify Fuller than any other transmission.*

And that's why with over 110 Fuller models to select from—both semi-automatic and full-manual control—*you'll find a transmission designed to do your job . . . better . . . at less cost.*

Fuller TRANSMISSIONS

FULLER MANUFACTURING COMPANY (Transmission Division), KALAMAZOO, MICHIGAN

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General contractors give assurance that they can handle expanded highway program economically and efficiently

AGC president George C. Koss, (center) head of Koss Construction Co., Des Moines, Iowa, takes time out to pose with other 1955 officers. Left to right are H. E. Foreman, Washington, D. C., managing director; John MacLeod, Paramount, Calif., retiring president; Mr. Koss; Frank J. Rooney, Miami, Fla., vice president; and J. D. Marshall, Washington, D. C., executive director.

mends that the program be carried out by the contract method, with contracts awarded to the lowest responsible bidder after public advertisement.

Another resolution commends the member firms who participate in active safety programs and recommends that all members participate in the association's accident-prevention program. This resolution further emphasizes the importance of the safety program being on a voluntary basis, and discourages legislation in this regard.

Profits Are Important

Citing the construction industry as an outstanding example of the operation of the free enterprise system, J. Wilson Newman, president of Dun & Bradstreet, Inc., stressed the importance of management's profits by pointing out that the industry is dependent upon the economic health of individual units. A profit he declared, also earns the confidence of customers and suppliers. The only alternative, Newman added, is the legislative approach.

In reviewing the business climate in which the industry is operating, Newman pointed out three factors as being most significant for the next ten-year period. The first of these is the population growth, which, coupled with the undeveloped natural resources of the country and the operation of the free enterprise system, should lead to continued prosperity.

The proposed road-building program and the practical application of atomic power were the other two factors Newman considered most significant for the coming decade.

Highway Program Considered

Many aspects of the proposed $101 billion highway-construction program were considered during the meeting. In an address at the opening session, Governor Robert F. Kennon of Louisiana, chairman of the Governors' Conference, warned that a hodgepodge program would not get the job done. He told the contractors that the plan as recommended by the Governors' Conference—and substantially followed by President Eisenhower in his recent highway message—"is the only feasible way of getting a road system built."

Kennon stated emphatically that "we don't need government construction of roads or a federal agency to do the job." He added that he thought the proposed federal bond issue for the interstate highway system would be "good and practical federal financing," and advised AGC members to let Congress know their feelings on the highway program.

The ability and willingness of the construction industry to handle the expanded program was indicated in an address by deputy commissioner

(*Continued on next page*)

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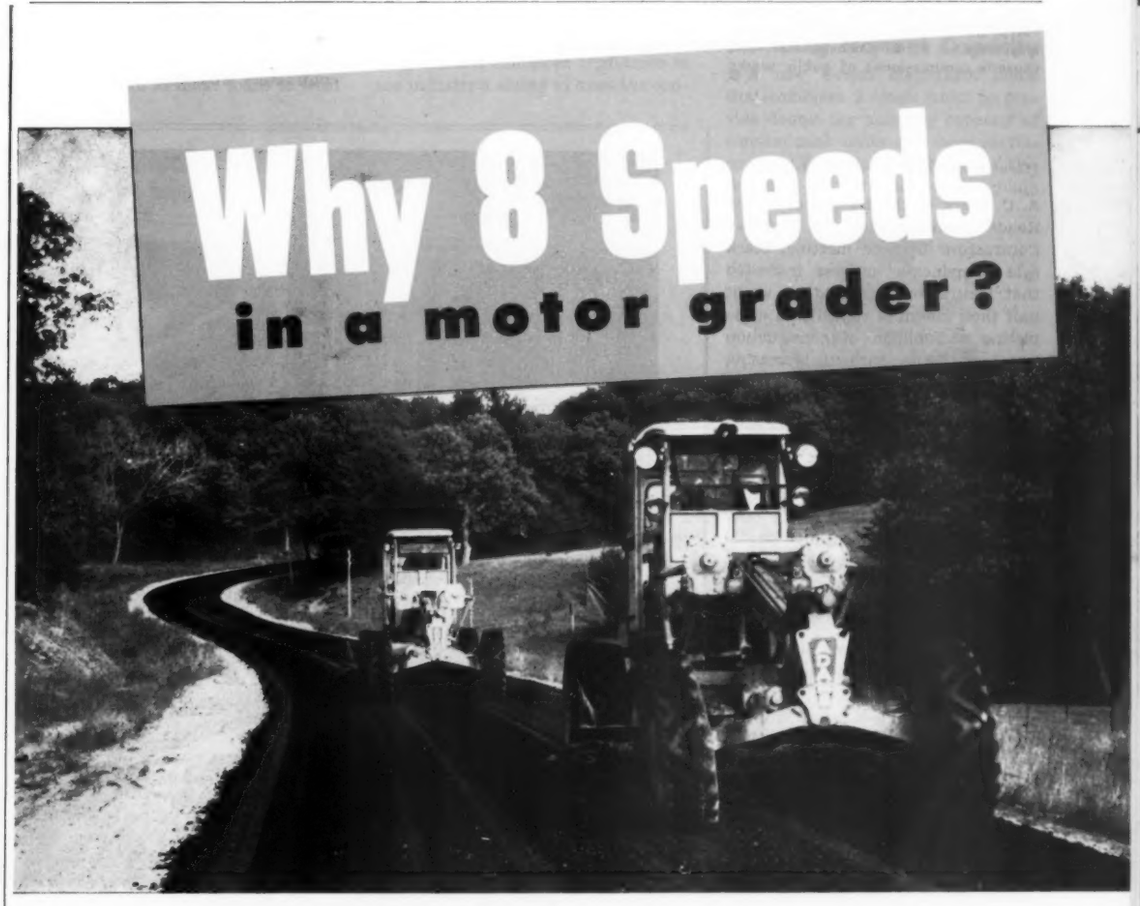
U. S. DEFENSE BONDS
NOW EVEN BETTER



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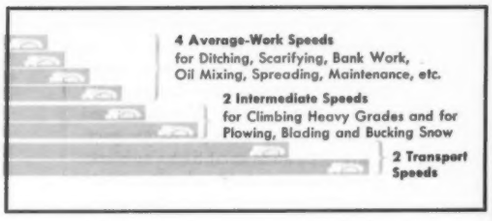
● Setting a motor grader's speed to work at the fastest practical rate (while using full hp.) can increase production as much as 10% to 25%, particularly on "constant-speed" work, such as ditching, oil mixing, spreading and surface maintenance . . . Adams 4 working speeds (instead of usual 3) enable operator to pick up this extra production to your profit . . . Also, Adams 2 transport speeds (up to 25 mph.) save more valuable production time in traveling up to 30% faster between jobs.

Other important advantages that make Adams Motor Graders your best buy include: 4 reverse speeds—optional creeper speeds (low as ¼ mph.)—easy-shifting, constant-mesh transmission—rubber-mounted engine—dual braking system . . . Available in 4 models, from 75 to 140 hp . . . Don't buy any motor grader until you investigate Adams—the most advanced line on the market. See your local Adams dealer or write


4 Average-Work Speeds
for Ditching, Scarifying, Bank Work, Oil Mixing, Spreading, Maintenance, etc.
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for Climbing Heavy Grades and for Plowing, Blading and Bucking Snow
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ADAMS 8 FORWARD SPEEDS

Adams Motor Graders give you 2 more forward speeds than most graders—8 instead of 6. These additional speeds give you an extra working speed—4 instead of 3—and a higher "high"—up to 25 mph.—for getting to and from the job.

ADAMS DIVISION • LeTOURNEAU-WESTINGHOUSE COMPANY • INDIANAPOLIS, INDIANA

Make your next motor grader an ADAMS

Speaking on several phases of construction at the AGC meeting were, left to right: W. A. Dexheimer, commissioner, Bureau of Reclamation; Rear Adm. J. R. Perry, chief, Bureau of Yards and Docks; Brig. Gen. D. H. Tulley, assstant chief of engineers for military construction, Corps of Engineers; and John A. Volpe, Massachusetts commissioner of public works.

Joint Cooperative Committee. Here again, the need for more highway engineers was stressed. Many of the delegates and members of the committee suggested better salaries, more rapid promotions, and the delegation of more responsibility to young engineers as means of increasing the pool of highway engineers. Attention was called to the fact that some contractors offer scholarships to encourage qualified young men to study engineering.

Adm. Perry, Gen. Tulley, and Commissioner Dexheimer spoke at a general luncheon session of the convention and also participated in the meeting of the Heavy Construction and Railroad Contractors' Division. Adm. Perry described a "delays damages" clause, now being inserted in navy contracts, which will protect contractors from loss if the government interrupts or suspends work on a project. He suggested that the new clause be used as a "safety valve" and be invoked only in cases of serious loss.

Adm. Perry praised the way the "vast majority" of the navy's construction contracts are carried to completion under most favorable relations between the Bureau of Yards and Docks' contracting officers and the nation's general contractors.

Outlining how "the Corps of Engineers has learned to rely upon contractors for construction performance," Gen. Tully said that in the middle thirties "about two-thirds of our construction was performed by our own forces." Today, he added, 95 per cent of our vast programs, military and civil, is done by contract.

Gen. Tully pointed out that "it has become an axiom that modern war is

(*Continued from preceding page*)

A. C. Clark of the Bureau of Public Roads. Speaking before the Highway Contractors' Division meeting, Clark said "convincing" surveys indicated that contractors operated at about half their potential capacity in completing $3.1 billion of construction last year. Thus, without increasing their plant capacity, contractors could do twice as much work. Clark indicated also that manufacturers of construction machinery are working at only a part of their capacity and are "ready to support expansion." He predicted an increase in the highway program for this year which would absorb some of this capacity. Clark noted that evidence now before Congress "overwhelmingly favors immediate action toward improvement of the interstate system on a scale that will result in its completion within a reasonable period of years." "Few important public questions," he stated, "have been so widely supported."

More Engineers Needed

Among the problems to be solved before the "long-range enlarged program" can get underway, Clark said, are financing, right-of-way acquisition, and engineering. Elaborating on the latter, he said: "Obviously, many of the new civil engineer graduates will turn to other industries in the practice of their profession. Even if they were all available to the highway profession, the supply would not be enough for the expansion contemplated." Previously, Clark had indicated that more than 4,000 additional engineers would be required for each $1 billion of additional highway work.

"Reliance must be placed on attracting older engineers from other industries, on the use of consultants, on increasing salaries of highway engineers, and on better utilization of engineers now employed on highway work," Clark concluded. Using aerial photography and photogrammetric methods in planning, using new mechanical devices for subsurface exploration and for traffic survey and analysis, and taking and computing cross sections were indicated as means of reducing engineering manpower requirements in highway design and construction.

A portion of the Highway Contractors' Division session was devoted to an open meeting of the AASHO-AGC

Next job is only minutes away with

mobile trencher

Parsons rubber-tired Trenchmobile® runs anywhere at a moment's notice. A job 6 miles away can be started in less than 30 minutes from "now". Trenchmobile drives there cross-town, through traffic at 12.6 m.p.h. . . . digs the trench at speeds up to 14½ feet per minute . . . drives on to next job without delay.

This mobility on rubber is the answer to all those widely-scattered, small yardage trenching jobs where you formerly had to bring in cumbersome, oversize equipment, or use slow, costly hand labor. Trenchmobile is big enough, too, for a lot of main-line excavations. You get trench widths from 8 to 16 inches . . . depths to 5 feet, for water and gas mains, service connections, pipe reclamation, foundation footings, underground cables, lighting systems.

Let Parsons distributor show you how rubber-tired Trenchmobile can put your jobs on a fast "work-and-run" basis. Also check Parsons 5 big sizes of ladder and wheel-type Trenchliners®.

HOLDS ACCURATE GRADE . . . Positive down-crowd on the digging boom starts cut fast, maintains accurate grade. Buckets are high-carbon cast steel. Self-sharpening, easy-in-easy-out "Tap-In" teeth assure top digging efficiency at every width and depth, in all types of soil and job conditions.

BACKFILLS ITS OWN TRENCH . . . Backfill blade (optional) doubles usefulness of the Parsons Trenchmobile . . . lets you do the entire job of trenching and backfilling with one-man, one-machine economy. The husky six foot blade is readily adjustable from straight bulldozing to angled position . . . is raised and lowered by hydraulic control.

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for literature on 43.6 h.p., rubber-tired Trenchmobile

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an engineering war." But because of "revolutionary advances in construction skill, processes, and equipment, and in the organization, administration, and capacity of the construction industry, we can tackle with confidence jobs which only a generation ago would have been considered impossible."

"It is, in a sense, a tremendous tribute to the construction industry," the general said, "that our planners—military, civil, and industrial alike—simply take it for granted that contractors will always be able to provide them with any construction they may need anywhere on earth." But he cautioned, "it is also a tremendous responsibility which is placed on your shoulders." He concluded by saying "it is because of the confidence in the American construction industry that the United States is ahead and will stay ahead in the race with our potential enemies."

Explains Reclamation Program

Speaking at this same session, Commissioner Dexheimer described some of the work of the Bureau of Reclamation. This bureau, he said, is required by law to return to the federal treasury with interest all money spent for power and municipal and industrial water within 50 years. The irrigation investment is also required to be returned, but without interest. More than one-fourth of the total thus far spent by the bureau has been returned to the treasury.

Reviewing current legislation affecting the Bureau of Reclamation, the commissioner called attention to a measure known as the Small Projects Bill. This, he said, "would authorize the bureau to make loans to local groups for development of their own irrigation systems." He added that such a law "should provide an incentive for people to build their own development, with a minimum of review or supervision on the part of the federal government." It could be extended to states east of the 17 western states presently covered by the operations of the bureau.

Looking to the future, Dexheimer said, "When the day arrives that truly cheap power can be generated from atomic plants, we will see one of the greatest expansions of irrigation the world has yet experienced. Only the cost of power for pumping purposes is keeping millions of acres of land out of irrigated production." He praised industry for its part in the irrigation and water-conservation program and expressed confidence in the industry's ability to meet the continuing challenge in the future.

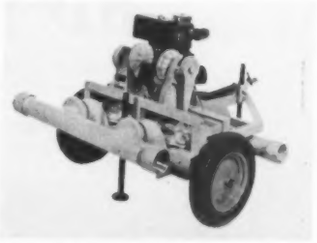
Receive Safety Awards

Sixteen firms were honored by AGC for their outstanding safety records in construction. Awards based on 1954 safety records and on records for the past five and ten years, were presented in several categories determined by the volume of operations measured in man-hours and by the type of work—building, highway, or heavy—involved. Bronze plaques were awarded to the firms with the best safety records in each classification.

The next annual convention of the association will be held in New York City. THE END

Pump Has Twin Diaphragms Doubling Normal Capacity

■ A new 4-inch diaphragm pump that combines 2 single units to provide double the pumping capacity of conventional units has been developed by Rice Pump & Machine Co., Belgium, Wis. The new double pump



Combining two diaphragms in one unit, this new Rice Milwaukee pump delivers up to 12 gallons per hour at a 10-foot suction lift.

delivers up to 12,000 gph at a 10-foot suction lift.

The pump has fully-enclosed helically cut gearing that operates in an oil bath on ground shafting and needle bearings.

Air-cooled engines transmit their power through a double-row roller chain which serves to synchronize the two strokes at 90-degree intervals. Also available are gear-head electric motors.

Mounted on pneumatic-tire wheels, the Rice-Milwaukee pump can be towed to the job.

For further information write to the company, or use the Request Card at page 18. Circle No. 851.

Equipment and Services For Diamond Coring

■ Diamond coring and drilling bits available from Hillmac Corp., 509 S. Loraine St., Midland, Texas, are shown in a booklet available on request. This concern offers core barrels and core and drill bits on an outright purchase basis or on a rental basis.

Under several services offered by the company, Coldset bits purchased outright can be returned for salvage. These are serviced and stored by Hillmac as often and as long as the contractor desires.

The concern also rents core barrels by the day, delivering them to the job site and picking them up.

In addition the company supplies trained coring engineers to supervise coring operations and to drill the required core footage at a flat rate per foot.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 919.

DODGES SIDE OBSTRUCTIONS . . . Shiftable, reversible belt conveyor places spoil bank on either side of trench . . . lets Parsons Trenchmobile work in close to buildings, poles, without swerving from grade line.

UNDERCUTS SIDEWALKS . . . With reverse traction and sloping ladder boom, Trenchmobile undercuts walks, curbs, gutters, old poles . . . makes vertical set-ins, flush against foundation walls. Saves hand work. Hinged crumber swings up, out of the way. CP 434

Hauls 1-ton load in gravity-dump hopper

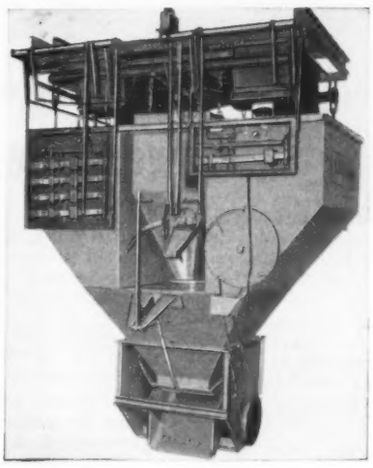
New Kwik-Mix R15 Moto-Bug® carries 2,000 pounds of any bulk materials in 15 cu. ft. hopper, or on 34x54-in. platform. It travels 6 m.p.h. forward and reverse, climbs 16% grades fully loaded, has 550 pounds drawbar pull for towing. Turning radius is only 73 inches; overall width is 35 inches. R-15 Moto-Bug can be equipped with 7-foot fork lift. Smaller 10 cu. ft. Moto-Bug with 34x48-inch platform and 6-foot fork lift also available.

KWIK-MIX • Milwaukee, Wis.
(Koehring Subsidiary)

Central cement feed prevents "gumming"

With concentric arrangement of aggregates around cement in the Johnson Concentric Batcher, all ingredients are intermingled as they flow through discharge. Reduces dusting, pre-shrinks materials. Cement is weighed individually on precision-beam scale; aggregates on accumulative dial scale or individual beam scales. Johnson Concentric Batcher sizes: 2 to 8 cu. yds., arranged for 2 to 8 aggregates, 1 to 4 types of cement.

C. S. JOHNSON • Champaign, Ill.
(Koehring Subsidiary)



Compare Koehring 205 with any other ½-yard

Crowd, swing, boom-hoist and retract clutches on Koehring heavy-duty 205 are among the largest used in the ½-yard class. Powerful cable crowd and electric push-button dipper trip maintain fast dig-and-dump cycles. Automatic traction brakes simplify operation, lock and hold the 205 when working or parked. Work capacity: ½-yd. shovel or hoe; ½ to ¾-yd. clamshell or dragline; 10-ton lift crane on crawlers; 15-ton truck crane.

KOEHRING Company
Milwaukee 16, Wis.
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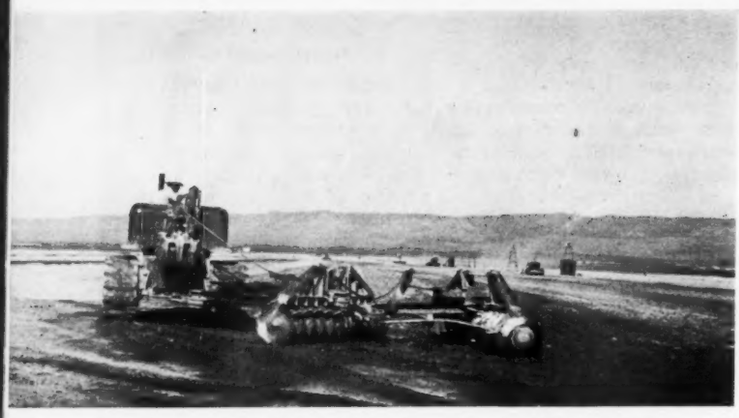


Pulled by an Allis-Chalmers HD-15, a Rome disk plow blends moisture with the soil as the subgrade is prepared for a new runway at Holloman Air Force Base in New Mexico. Compaction was one of the trickiest phases of the job.

Air base paving is laid with concrete and asphalt

by ED KRUESEL, general superintendent,
H. B. Zachry Co., San Antonio, Texas
with RAY DAY

At Holloman Air Force Base near Alamogordo, N. Mex., where the air force is experimenting with the development of guided missiles, H. B. Zachry Co., San Antonio, Texas, contractor, has hurried a $1,950,000 improvement job to completion. Including both portland-cement and asphaltic-concrete paving, as well as the installation of electric lines, the job enlarged runway and taxiway ground facilities for aircraft using the important research center.

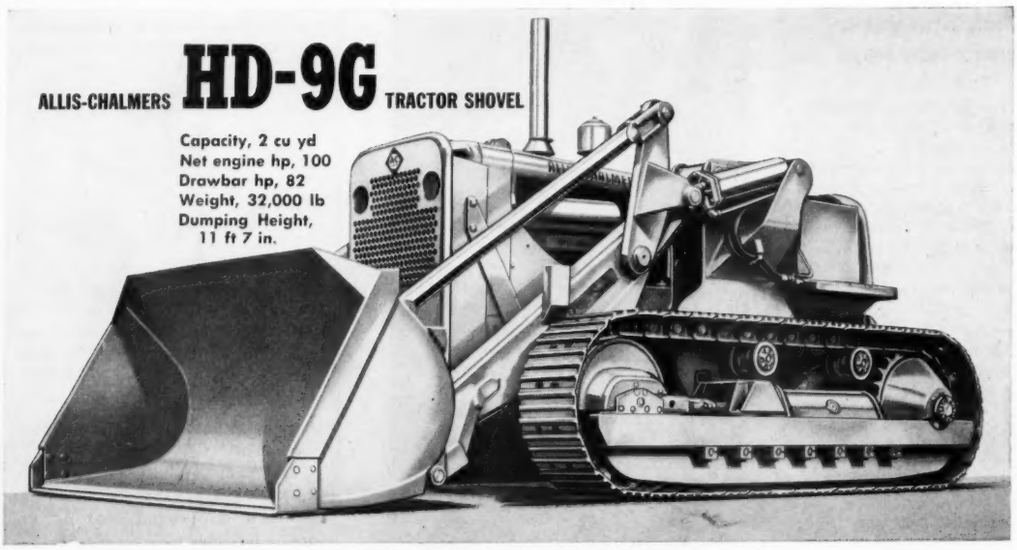
Started July 9, 1954, the job was finished early last March—well ahead of the June 1 deadline—despite such construction problems as rain, dust, paving delays caused by the landing of drone airplanes, and trouble with excess 200-mesh fines in practically all the construction aggregates.

Broken down by types of paving, the job included the following items:

1. A taxiway, 4,500 × 75 feet, paved with 4 inches of asphaltic-concrete. Under this taxiway is a stabilized aggregate base 18 inches thick. It is compacted to 100 per cent modified AASHO density, modification represented by 55 blows of a 10-pound tamper traveling a distance of 18 inches per blow. Under this stabilized aggregate base is 18 inches of earth subgrade compacted to a modified AASHO density of 97 per cent.

2. A 3,600 × 150-foot extension to the north-south crosswind runway. It, too, has a 4-inch asphaltic-concrete pavement, set on 25 inches of stabilized aggregate base, and 10 inches of earth subgrade—both compacted as previously detailed.

3. A new primary runway, running from southwest to northeast, 10,880 × 300 feet. Construction of this runway was planned around 1,000 feet of 18-14-18 portland-cement-concrete pavement at each end, with 4 inches of asphaltic-concrete pavement in the remaining main portion. The plans called for 14 inches of stabilized ag-

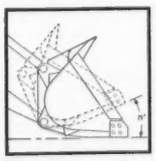


POPULAR 2-YD HD-9G TRACTOR SHOVEL NOW OFFERS

Higher Work Capacity

Design refinements in the Allis-Chalmers HD-9G now make it even more productive than ever. First, the net engine output has been increased to 100 hp, with 23,000 lb of push for extra crowding and digging ability, fast work cycles.

Streamlined bucket design now helps roll in large loads with less tractor effort. The back of the bucket has been brought forward and the sides extended to cut spillage, put more pay load where it's wanted. Cleaner dumping with the new bucket saves the operator time and effort shaking out loads.



A new addition to the wide variety of attachments available for the HD-9G Tractor Shovel is the Tip-Back bucket which allows the operator to roll the bucket back approximately 25° at ground level. Ideal for handling greater capacities of loose stockpiled materials, the Tip-Back bucket can be carried lower to the ground for greater stability . . . can load bulky objects easier.

New-type ceramic master clutch lining reduces lever pull, makes it easier for the operator to do more. The new HD-9G helps the operator do more in other ways, too — giving him full vision, fast and easy control, cleaner platform and more comfortable seat from which to work, and more working time with truck wheels, support rollers and idlers that need greasing only once every 1,000 hours.

Lower Operating Cost

Design improvements also add longer life to the HD-9G under all work conditions. Heavy box-section booms are 50 percent stronger, assuring proper alignment even working in the toughest materials. The low design of the new HD-9G combination stabilizer and cowl not only offers easy accessibility for maintenance and service, but contributes to maximum operator vision. New ceramic master clutch lining operates longer between adjustments, increases clutch life.

Hydraulic system provides new maintenance simplicity, safety of operation, as well as improved visibility. With new-style tank, there are few external fittings, greatly reducing possibility of outside leaks. Magnetic filters and suction-line screens protect the entire system from damaging grit. New, improved hydraulic pump is designed for long life as well as fast and accurate bucket action.

Heavy-duty truck wheels and idlers are available for particularly tough working conditions. One-piece, full-length main frame permits unit construction so that major assemblies can be removed without disturbing adjacent units, putting tractor back on the job in hours rather than days.

☆ ☆ ☆

See your Allis-Chalmers dealer for further information on what the HD-9G can do for you — or a demonstration right on your job.

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TRACTOR DIVISION — MILWAUKEE 1, U. S. A.

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A heavily ballasted Tampo pneumatic compactor rolls the subbase on this stretch of new runway. In the background, trucks have dumped unprocessed material in windrows for later incorporation in the base course.

Here one of the two Barber-Greene finishers on the job puts down asphalt surfacing over the well compacted base courses of the new runway. The asphaltic concrete is laid in runs of about 500 feet to eliminate cold longitudinal joints.

gregate base under this asphalt pavement, with 14 inches of compacted subgrade. Subgrade densities were 97 per cent in the upper 11 inches, and 92 per cent in the bottom 3 inches. This main runway construction also included jet blast pads at each end, consisting of 6 inches of stabilized aggregate and 2 inches of asphaltic-concrete pavement.

4. Similar blast-pad construction was included at the end of the cross-wind runway extension, and also on the left side of the taxiway. Another item was the construction of 50-foot shoulders with 4-inch stabilized aggregate for a dust palliative on the sides of the new facilities. In order not to interfere with research and testing work on the base, a construction program was arranged in three phases. Phase 1 covered the important construction around a secret loading area, phase 2 covered the remaining half of construction around this area, and phase 3 covered new construction on the main runway.

Difficult Grading

We knew from the start that grading at Holloman would be heavy, especially since it was necessary to handle some of the material twice. Approximately 400,000 cubic yards of earthwork was covered in the grading plan, and much of this material was in cut sections. When plans call for the top 18 inches of a cut section, for example, to be compacted to high density, you don't stop at the grade line. You go deeper, stockpile part of the material for rehandling—maybe you haul it to an adjacent area for a direct dump if you're lucky—and then you start building the critical 18 inches up to high density from the bottom. Nobody has yet found an economical way of handling 18 inches of compaction with any degree of ease without this type of secondary

(*Continued on next page*)

INVEST IN

U. S. DEFENSE BONDS

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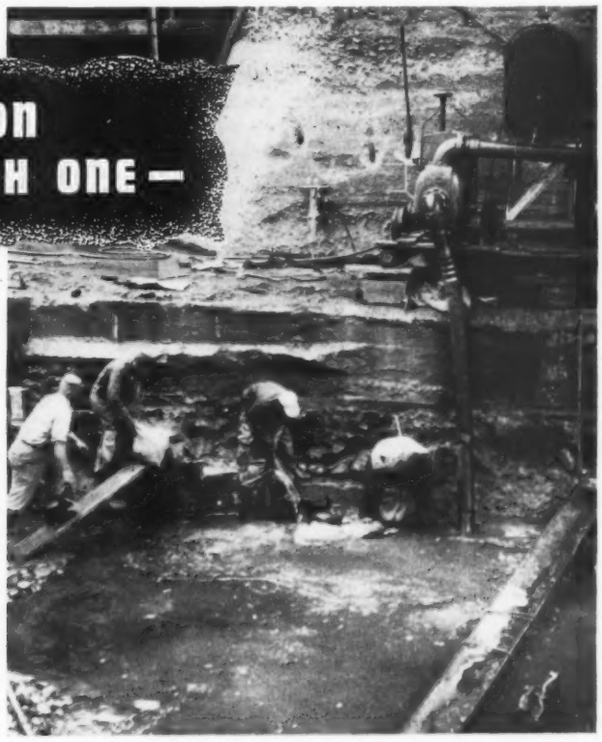
BARNES AGAIN ON ANOTHER TOUGH ONE—

BARNES 90M's used on repairs to Movable Dam No. 5 and Lock No. 9 Erie Barge Canal.



On jobs that depend on moving plenty of water fast, it's Barnes First! Intrusion Prepakt, Inc., of Cleveland, tackled a real "toughie" when it contracted to make permanent repairs to Movable Dam No. 5 and Lock No. 9 at Rotterdam Junction, N. Y.

Working areas in the coffer dams had to be dewatered at top speed! Here again, Barnes Pumps delivered peak performance — 24 hours a day, a terrific responsibility — and Barnes Pumps did a terrific job! That's why the Contractors who handle the tough ones call on Barnes for dependability and performance under the most adverse conditions.

On the really tough ones, where performance is a "MUST" — play it safe and call for Barnes Pumps. See your distributor or write Barnes about your problem. There's a Barnes Self-Priming Centrifugal Pump to solve it!

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BARNES BIG 3

1 **33,000 for 1 Economy**
33,000 gallons of water pumped for one gallon of gasoline!

2 **Barnes Self-Priming**
Fast, dependable priming with as low as one-third normal water level in Pump body.

3 **On the Job Servicing**
Advanced, simplified design for quick easy servicing in the field.

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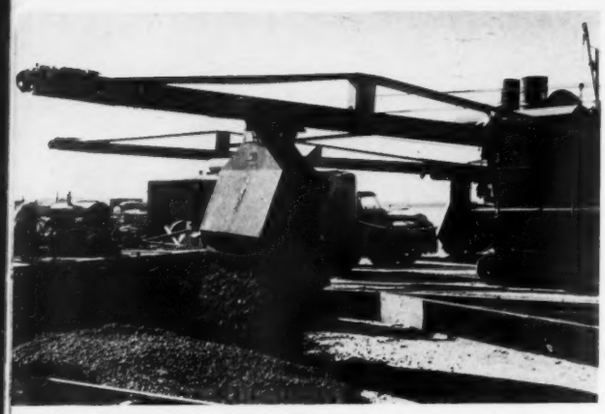

Concrete for the runway ends is laid by a Koehring Twinbatch 34-E paver, one of two such rigs which led the concrete-paving spreads.

Dreyer vibrators, mounted 18 inches apart on the rear of a shop-altered frame, effect internal surface consolidation of the concrete. A Jaeger finisher (left) follows the vibrating frame.

(*Continued from preceding page*)

moving. Our limiting factor, in other words, was compaction rather than the amount of material our equipment could move.

The necessity for getting the grading out of the way as soon as possible was so urgent that the job organization was set up around two 9-hour grading shifts per day, with production in that period between 4,000 and 5,000 cubic yards. The equipment fleet included four Caterpillar DW20's for dirt moving, five Gebhard dual-drum sheepsfoot rollers (we pulled two double-drum sets behind a D8 and the remaining single drum behind an Allis-Chalmers HD-15), a Tampo 50-ton pneumatic compactor, a Rome disk-type plow to blend moisture with the soil, six 4,000-gallon water-tank units, and four Caterpillar No. 12 motor graders. We used a small Buckeye ditcher for cutting electrical conduit trenches.

Compaction

The soil at Holloman is a nonplastic, dry, inert material, high in 200-mesh fines, and extremely tricky to handle as far as compaction is concerned. It's a waste of time in this soil to attempt to get compaction without first obtaining a near-perfect blend of the optimum moisture content throughout the lift. This was done by making repeated passes through the material with water-hauling trucks, manipulating each lift thoroughly with the Rome plow, and finally compacting it with sheepsfoot and pneumatic rollers. In some instances, up to eight passes were made before the high degree of compaction had been developed.

In places where we handled the dirt twice, we usually went down to within approximately four inches of the bottom of the subgrade with excavation. Starting with the 4 inches of material remaining, we ripped and blended and applied moisture and disking, ending eventually with the compaction of that lift. The material which had already been handled once by our DW20's then was picked up and brought back in, and the process was repeated until the subgrade was built up. Repeat handling was not necessary in fill areas, because there the subgrade material could be brought in the first time, manipulated in the same way, and laid down.

Tough Base Course

Almost equally difficult was the stabilized aggregate base work, which

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...a rugged specialist built with LIMA quality to fill your on-the-job requirements

Your on-the-job requirements are the key to design and construction of the brand new ½ yd. Lima Type 24. It's *your* machine, a rugged specialist built with traditional Lima emphasis on quality . . . to give you top performance without costly maintenance.

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All gears have machine cut teeth.
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Inside dipper handle—square cross section.
Safety glass throughout.
Dirt seals in tread rollers.

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High speed independent boom hoist with engine controlled boom lowering.
Large diameter hoist, crowd, swing and propel brakes.
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Internal-external tooth jaw clutch for quick engagement, minimum backlash in gear train.
Independent combination chain and cable crowd and retract.
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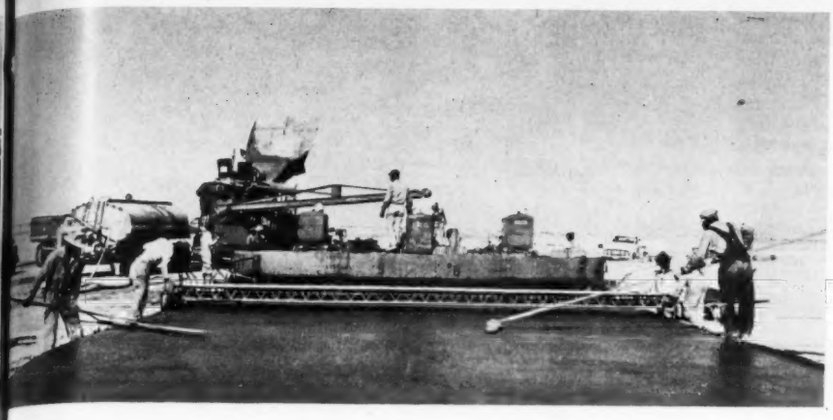
Air for main and auxiliary controls.
Differential steering (similar to tractor).
Easily convertible to pullshovel, dragline, crane or shovel.



Hand finishing of the concrete slab is the next-to-last step in the paving-finishing operation. A Koehring longitudinal float finisher is the rig just ahead of the aluminum joint-finishing bridges.

involved the twin problems of blending and compaction. The only available subbase rock was alluvial in character and lay in washes near the range of mountains fringing Alamogordo on the east. The rock pits were characterized by dirtiness, an excess of 200-mesh fines, and a tendency to fracture badly under the action of crushers. Laid in a windrow, the material was much harder to mix than limestone.

To help speed the production of this material, a subcontract for the production of aggregate for the base course and both types of concrete was let to Tony Llewellyn of Alamogordo, who made a further business arrangement with Lowdermilk Bros., Denver, to help with the job. An all-Pioneer setup, consisting of Pioneer jaw crushers and Pioneer rolls and screens arranged in series to produce this material, was brought in. Private truck operators were hired to deliver the crushed rock to Holloman.

The relatively remote location of the job had made it necessary for Llewellyn to hire trucks wherever he could, and therefore no standardization was possible so far as body types or make of units was concerned. New trucks hired by Llewellyn were measured and the bodies calibrated. As a further safeguard, the loads were weighed. When they arrived on the job, they were dumped by Corps of Engineers inspectors and dump spotters to deliver exact volume. Inevitably, there was considerable segregation as the material was dumped.

It was in this segregation that we first began to notice the peculiar tendency of this rock. Crushed limestone in this part of the Southwest, for example, can be leveled in a windrow, split, and each half moved to one side and back again to achieve a thorough blending. In this material, however, it was necessary to flatten the windrow, then blade it to the far side of the strip and bring it back again before good blending could be achieved. It was good business during this process to add repeated shots of water to develop the optimum moisture content.

In spite of these difficulties, a sufficiently good system was developed so that approximately 3,000 cubic yards of granular base could be mixed out and laid down in an 8-hour shift by one Caterpillar No. 12 motor grader. On the final laydown of material, the particles were well blended, the optimum moisture content was in, and the only mechanical manipulation remaining was that of compaction. It was developed by making two passes, first with a Gebhard sheepsfoot roller, and then following with from four to six passes of the Tampo 50-ton pneumatic machine. The top of this stabilized aggregate base under asphaltic-concrete pavement was finished off with an application of MC-0 asphalt for a prime coat.

Hot-Mix Setup

In spite of never ending difficulty caused by excess fines in the aggregate mix, one of the most efficient layouts on the project was the hot-plant setup and the organization for asphaltic-concrete paving. It was possible to set this operation up around a production schedule of 200 tons per hour, because the company had purchased a Cedarapids G-60 bituminous

BRIEF SPECS—LIMA TYPE 24	SHOVEL	CRANE	DRAGLINE	PULL SHOVEL
Length of boom (standard)	16'6"	30'0"	30'0"	17'6"
Length of dipper handle	13'3"	---	---	6'0"
Overall length of crawlers				
—standard truck	10'2⅛" max.	10'2⅛" max.	10'2⅛" max.	10'2⅛" max.
—long & wide truck	11'9¼" max.	11'9¼" max.	11'9¼" max.	11'9¼" max.
Overall width of crawlers—				
Standard truck with 16" treads	8'0"	8'0"	8'0"	8'0"
Long & wide truck with 16" treads	9'4"	9'4"	9'4"	9'4"
12" and 30" treads optional on standard and long and wide truck				
Height of gantry above ground	9'8⅛"	9'8⅛"	9'8⅛"	9'8⅛"
Rear end clearance—maximum counterweight	8'11¼"	8'11¼"	8'11¼"	8'11¼"
Overall width of cab	7'10¾"	7'10¾"	7'10¾"	7'10¾"
Swing speed (R.P.M.)	4.2	4.2	4.2	4.2
Travel speed (high)	1.9	1.9	1.9	1.9
Capacity of fuel tank (gallons)	39	39	39	39
Approximate working weight	27,000	31,250 (with max. cwt.)	30,325 (with max. cwt.)	32,375

The Type 24 is a glutton for work . . . and Lima quality-construction enables it to travel and work anywhere at lowest operating cost.

Truck mounted for fast over-the-road travel, the Type 24 gives you maximum job mobility for extra production.

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CAPACITIES

LIMA Shovels, Cranes and Draglines are made in the following capacities:

SHOVELS	CRANES
to 6 yards	to 110 tons
DRAGLINES	PULLSHOVELS

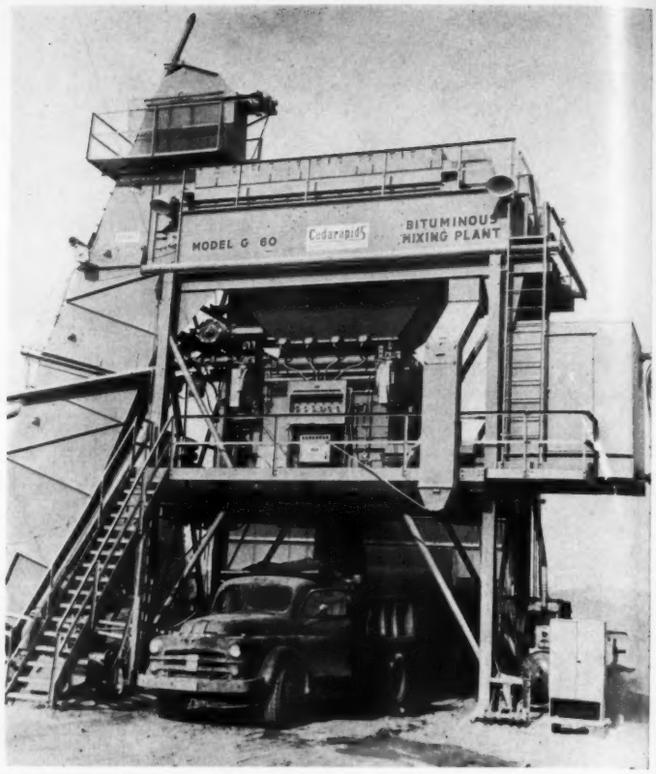
Smaller machines available on rubber.

mixing plant and two Barber-Greene laydown machines to place the material turned out by this plant.

The bituminous plant is one of the first fully-automatic machines seen in the Southwest, and is capable of turning out repeated 6,000-pound batches without the constant attention of an operator. With the aid of Hardy automatic electric scales, the machine can even be set up for batching two different mixes.

Because of the predominance of excess 200-mesh fines, it was necessary to make a minor field alteration on the plant. As stock equipment, the plant came from the factory with a normally adequate dust-collection system, integral return provisions to the mix, and a vertical stack at the end of the dust-collection system. But excess fines in this mix soon caused dust to begin drifting over residential and operations areas of the base, and it was necessary to alter the plant to remove the objectionable fines from the smoke. This was done by bringing in a 10,000-gallon horizontal tank, installing the plant stack at one end, and turning the stack discharge horizontally into the tank at the opposite end. As the smoke from the dust collector roared into the tank, a high-pressure water spray was applied which washed out the fine material and left the smoke free to escape out the stack in the other end of the tank. Excess fines were wasted in a nearby natural drainage channel leading to lower ground.

Set up near the main gate of the base, the plant had ample room all around for the storage of aggregates and other material. Aggregates and sand, of course, were trucked in from the Llewellyn production facilities,



The Cedarapids bituminous mixing plant used on this air base project is fully automatic. Here it dumps a 6,000-pound batch to a waiting truck, despite the fact that no operator is attending the plant.

stacked in four piles, and charged to the plant by a Bucyrus-Erie 22-B clamshell. This machine, equipped with an Owen 1-yard outsize clam bucket, loaded the material to a four-compartment hopper, which by means of manually operated bottom gates fed a conveyor which dumped into the cold elevator of the plant system.

Asphalt of 85 to 100 penetration was being trucked in from the Col-Tex refinery at Colorado City, Texas, and unloaded by means of a small Kinney asphalt pump to two horizontal 20,000-gallon asphalt-storage tanks. Well insulated, these tanks were capable of storing the necessary asphaltic cement for the hot-mix item. There was a second storage system, consisting of a two-compartment 12,000-gallon horizontal tank, for RC-2 and other tack coat materials. Asphalt in these tanks was kept at a constant 300-degree temperature by a Childers C-100 circulating oil heater, which operated automatically to keep the oil at the required temperature. The asphalt storage and piping system was also equipped with

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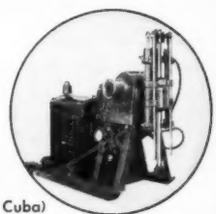

In building the new Almendares Vehicular Tunnel between Vedado and Miramar (two popular communities in Havana, Cuba) four Acker Hydraulic Feed Core drills were used for drilling grout holes. Working *around the clock for almost three months*, the four Ackers showed little sign of wear.

Rugged construction, simplicity of operation and the many exclusive features that Acker designed and developed during the past 30 years.

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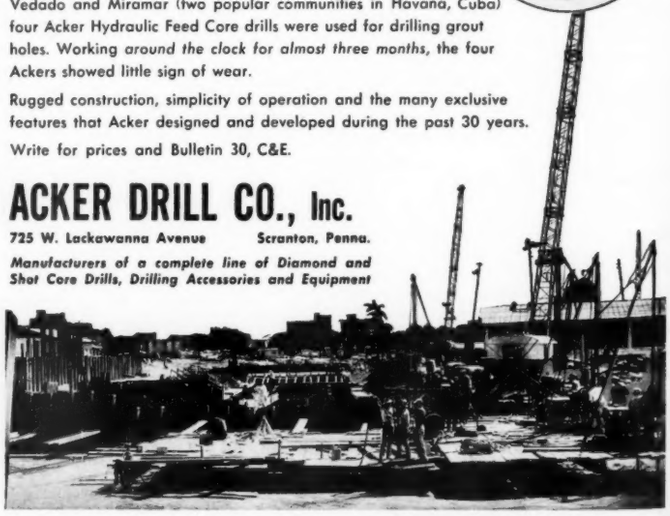


a Foxboro automatic temperature controller, and each storage tank had a Rochester dial thermometer easily accessible for reading. A Kinney 4-inch asphalt pump maintained a loop pressure to the plant hot pot, delivering the necessary bitumen as needed. Weigh gates on the plant were opened automatically by air-driven rams, served by a Quincy air compressor, and controlled automatically by the Hardy automatic electric control system.

The Corps of Engineers had designed the asphalt concrete mix around probable tire-loading pressures of 200 psi. Other characteristics of the design called for a Marshall stability factor of 1,000 or more, a Marshall flow of 16 or less, from 3 to 5 per cent of voids in the surface course, and from 5 to 7 per cent of voids in the binder course. Gradations hit the specifications "right down the middle,"

Screen Size	Per Cent Passing
1 in.	100
¾ in.	96
½ in.	80
⅜ in.	72
No. 4	51
No. 10	36
No. 20	26
No. 40	18
No. 80	12
No. 200	6-2

Bin Number	Per Cent Used	Pounds Used
No. 1 (fine)	31	1,784
No. 2 (intermediate)	14	806
No. 3 (⅜-¾ in.)	23	1,323
No. 4 (¾-1 in.)	32	1,841

Asphalt 4-6 per cent tolerance (4.1 per cent actual).

The hot-mix asphaltic concrete was laid by two Barber-Greene tamping-leveling finishers. Because of the necessity for eliminating cold longitudinal joints, short strips of about 500 feet were laid in one run, and then the laydown machines moved back. This is in conformity with the new Corps of Engineers practice. Two Huber three-wheel 10-ton steel rollers were used for compaction, and the joints were given a special rolling by a Tampo 13-wheel pneumatic machine which was able to develop the necessary 98 per cent densities in the mix. Under new Corps of Engineers practice, half the density samples are taken along the longitudinal joints to insure that good densities are developed at that point.

One of the more interesting contract provisions gave the government the right to shut down our paving operations for as much as 20 hours per month even when nothing was wrong. This is necessary in order to give base research personnel a chance to practice-land pilotless aircraft and other new equipment. These shutdowns, which usually last from 20 to 30 minutes, are ordinarily preceded by some warning, so that paving equipment and trucks can stand by during the delay without too much material in transit.

Heavy Concrete

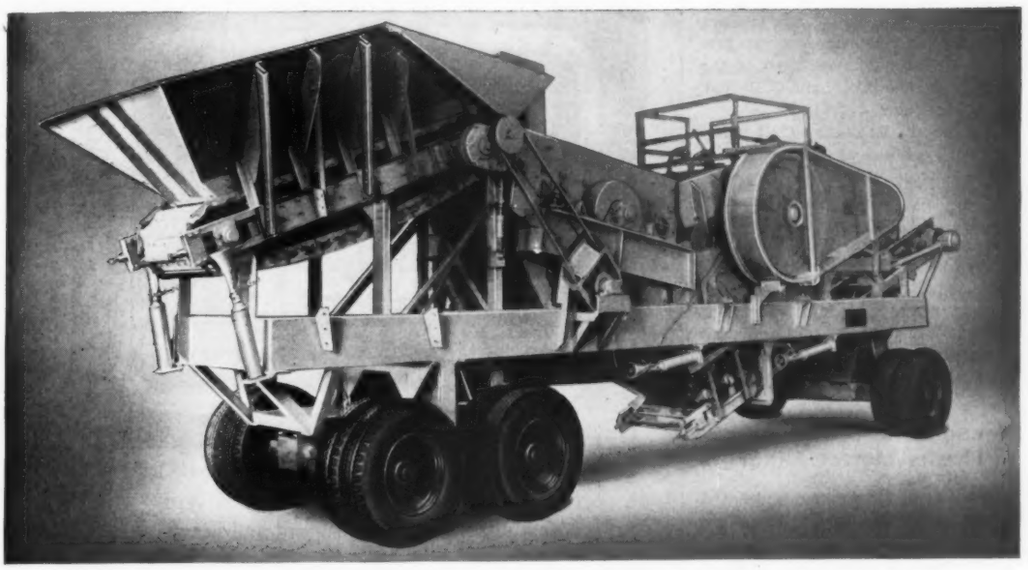
Our concrete operations were set up on the basis of 1,000 linear feet of 25-foot lane, placed in one 7-hour shift, with paving equipment moved back ready to start the next 1,000-foot lane the next day. This production schedule was maintained in good order at all times. The subgrade had been fine-graded by a drag planer, manufactured by Shovel Supply Co., Dallas, and pulled by a Cat No. 12 motor grader. In building up the subgrade, it had purposely been left about ⅜ inch high to provide enough excess material for the planer to work. Side forms consisted of Heltzel 18 and 14-inch steel panels, which were handled both by a truck-mounted Pitman Hydra-Lift and by a truck-mounted Tulsa winch, with a short boom. A Joy 105-cfm compressor and two hand-held pneumatic guns were used for driving form pins.

In our paving-equipment lineup, we used two Koehring Twinbatch 34-E pavers, a Jaeger concrete spreader, a shop-altered frame carrying on 18-inch centers a series of Dreyer electric vibrators, a Jaeger concrete finisher, a Koehring longitudinal float finisher, and a Heltzel Flex-Plane automatic spray machine. This machine applied Protex concrete-curing solution to the surface of the slab after it had been finished by long-handled bullfloats and given a burlap drag finish.

An enormous amount of mixing water was needed. Brought in from the base water supply, it was handled by a 4,000-gallon water trailer towed behind one paver. The water transfer was made between the trailer and the paver by a Gorman-Rupp 4-inch irrigation-type pump. The pavers laid the fresh concrete by working simultaneously on the slab, one machine pouring the bottom half and the next machine pouring the top. This operation used about five carloads of El Toro cement per day.

The cement was shipped in bulk from El Paso, Texas. It was spotted at the base on a railroad siding, handled by a screw-feed conveyor, and stored in an 800-barrel cement bin. The aggregate bins and weighing mechanism were both Johnson.

The presence of an extremely hard abrasive rock in the concrete aggregate made it impractical at the least to saw contraction joints in the pave-



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● You've demanded it so here it is . . . PIONEER's new 150 PRS Primary Crushing Plant. This record breaker is completely portable and is designed either to work with a secondary plant or to be used alone for producing ballast.

Why Production Is High

The two-deck Mesabi screen, *located between the apron feeder and the jaw crusher*, is one reason why the 150 PRS is breaking production records. This screen removes and by-passes smaller sized material to the output conveyor so the jaw crusher receives only oversize for reduction. This feature increases efficiency of the jaw crusher and thus boosts output of entire plant, because both jaw and screen are utilized to full advantage.

The high capacity of this plant's big 2036 *overhead eccentric* jaw crusher is another reason why production runs so high. It works on the forced-feed principle, made possible only with overhead eccentric crushing action. With each crushing stroke, the pitman crowds material down and through the crushing chamber . . . crushing at a rate of 250 strokes per minute. With this action you can take on even the toughest kind of crushing with assurance of high output.

Weighs Only 56,000 Pounds

The 150 PRS consists of a 36" x 10' apron feeder, 4' x 6' Mesabi screen, 2036 jaw crusher, and conveyor, all mounted on a rubber tired chassis.

Yet, despite big units, it weighs only 56,000 lbs. less power. It's compact, too . . . only 38'5" long, 13'8" high and 8'6" wide when set up for operation!

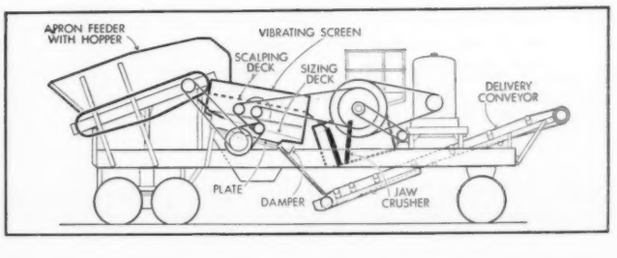
For further information on the 150 PRS or other PIONEER Portable or Stationary Crushing and Screening Plants, write Pioneer Engineering Works, Inc., Minneapolis (Subsidiary of Poor and Company, Chicago).

SPECIFICATIONS

Apron Feeder	36"x10" with forged steel pans
Mesabi Screen	2-deck, 4' x 6'
Jaw Crusher	20" x 36"
Jaw Crusher capacity	95-190 tph*
Delivery Conveyor	30" x 18'
Hp required	110 continuous at 1200 RPM
Weight, less power	56,000 lbs.
Travel height	12'7"

*3"-6" setting. Varies ± 25% according to material. To compute total plant output, add by-passed material.

Pioneer Continuflo EQUIPMENT



Pioneer Engineering Works, Inc., 1515 Central Ave., Minneapolis 13, Minn.
Subsidiary of Poor & Company • Chicago
Please send information on equipment checked.

☐ GRAVEL PLANTS ☐ WASHING PLANTS ☐ MECHANICAL FEEDERS
☐ ROCK PLANTS ☐ BITUMINOUS PLANTS ☐ VIBRATING SCREENS
☐ JAW CRUSHERS ☐ APRON FEEDERS ☐ BUZZER SCREENS (LIGHT DUTY)
☐ ROLL CRUSHERS ☐ ORE FEEDERS ☐ CONTINUFLO CONVEYORS

Name_____
Company_____
Address_____
City_____ Zone____ State_____

EAGLE BREAKER BALLS

Available of abrasion, impact resistant Ni-Hard nickel-chromium-iron alloy for high breaking efficiency and tough semi-steel for regular jobs. Pear shaped, with easily replaced hook, in 5 sizes; 1500 lbs. to 8000 lbs. Spherical in 6 sizes; 1275 to 8350 lbs. Ask for Bulletin 152 on breaker balls, line weights, pile hammers.

Largest Manufacturers of Concrete Aggregate Washing-Classifying Equipment—Send for Catalog 55.

EAGLE IRON WORKS
159 Holcomb Ave., Des Moines, Iowa

ment. Consequently, the necessary joints on 25-foot centers were formed with steel wedges and finished off by cement finishers, working from several small lightweight truss bridges reaching between the forms. Despite a period of high wind, which closed the job down for several days, as well as delay caused by base operations and a few other factors, the concrete pavement went down speedily and was finished by December 7.

All told, the job is an excellent example of modern airfield paving placed to modern high standards despite the difficulty of finding laboratory-perfect materials in the locality. The job was marked from start to finish by excellent cooperation between the Corps of Engineers and our personnel, and is one H. B. Zachry Co. is proud to have done.

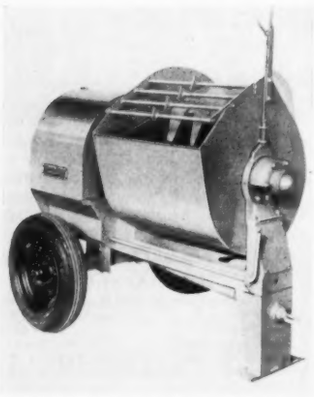
Personnel

For the U. S. Army Corps of Engineers, the job was represented at field level by Lynn Stogsdill, resident engineer, and Robert Merritt, field engineer. Both men reported to the district engineer, Col. Lynn C. Barnes, at Albuquerque.

Heading H. B. Zachry Co.'s forces was the writer, who was assisted by Abel Cruz, project engineer; C. C. Elkins, concrete superintendent; Wayne Waggoner and John Martin, dirt foremen; John Ellis and Angel Kruse, head mechanics; Herb Nelson, asphalt superintendent; Melvin Hines, asphalt laydown foreman; James Scott, asphalt plant foreman; and Arthur Lenz, electrical and concrete plant foreman. THE END

Announce Improvements In Plaster-Mortar Mixer

■ Structural improvements in the Model 6-P tilting mixer have been announced by the Kwik-Mix Co., Milwaukee 16, Wis. The unit, a plaster and mortar mixer with a 6-cubic-foot capacity, is now being produced with an all-welded frame section that is coil-spring mounted on a telescoping axle.



The redesigned Kwik-Mix Model 6-P tilting mixer.

A graphite-impregnated packing gland on the paddle shaft can be adjusted for wear to prevent leakage. Optional rubber blades are available for the four mixing blades. Positioned at 90 degrees around the paddle shaft, the blades are slotted for radial and longitudinal adjustment.

For further information write to the company, or use the Request Card that is bound in at page 18. Circle No. 950.

Devices Protect Workers From High-Level Noise

■ Two items of protective equipment for employees who must work under high-level noise conditions have been announced by Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8, Pa. The MSA Earsaver is designed to provide protection for workers exposed continuously to high-intensity noise, and the Noisefoe is for men who must enter and leave noisy areas frequently.

Both devices use an over-the-ear cushion formed from a soft spongy material which effectively soaks up large-amplitude noise waves.

The Earsaver, a peaked cap which holds two ear cushions in position over the wearer's ears, is available in three sizes, each equipped with an adjusting strap at the back. The Noisefoe has ear cushions attached to a spring-type head suspension for added convenience. It can be adjusted easily to fit any head size well.

The MSA Earsaver presses spongy cushions against the wearer's ears to protect him from excessive noise.

For further information write to the company, or use the Request Card at page 18. Circle No. 814.

Cab for Tractor-Loader

■ A cab for Caterpillar HT4 Traxcavators is described in a catalog sheet recently issued by Crenlo, Inc. The cab's construction, dimensions, installation, and optional accessories are covered.

The cab fits all Traxcavator-equipped D4 tractors — beginning with serial number 7U11952—which are not equipped with fender fuel tanks.

To obtain this literature write to Dept. KP, Crenlo, Inc., Rochester, Minn., or use the Request Card at page 18. Circle No. 951.

GAR WOOD
Presents
'EQUIPMENT THAT SUITS THE JOB'

. . . The Gar Wood '75' line of ¾ yard excavators, in both standard and heavy-duty models and 20-ton truck crane, have ably and economically handled a wide variety of jobs. Check the many Gar Wood advantages before placing *any* order!

Quarry work...

Gar Wood's independent travel while swinging permits faster moves away from rock slides to increase safety factor. Drop ball can operate from second drum without hooking to bucket teeth. Less wear and tear because fluid coupling operates to meet varied rock conditions.

Sand and Gravel...

Full dippers and fast loading pay off on sand and gravel work. Gar Wood's positive independent chain crowd gets full engine power into the load — dipper retracts at twice the crowd speed. Power actuated drum clutches cut operator fatigue — get more tons loaded per day.

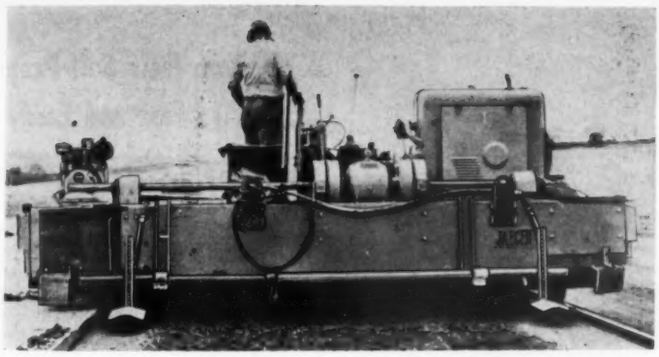
Concrete work...

Concrete work requires the same smooth, precision operation necessary on steel erection and a Gar Wood '75' can position buckets to perfection. The 75BT, heavy-duty truck crane, is extremely mobile — both on the job and on moves from job to job—saves time, cuts costs!

Side-Form Vibrator Designed for Mounting on Spreaders and Finishers

■ A new side-form vibrator attachment designed for mounting on concrete spreaders and finishers to vibrate concrete surrounding road forms has been announced by Maginniss Power Tool Co., Mansfield, Ohio. The Hi-lectric side-form vibrator will mount on the 12 to 24-foot Jaeger or Blaw-Knox concrete spreaders and the 12 or 24-foot Jaeger, Blaw-Knox, or Heltzel finishers. It is also adaptable to telescoping-type finishers.

The attachment consists of 2 Maginniss-Hi-lectric motor-in-head concrete vibrators spring mounted on a shaft and hanger assembly. The vibrator heads, raised or lowered by a hand lever, ride below the surface of the concrete for maximum efficiency.



The Maginnis Hi-Lectric sideform vibration attachment is shown mounted on a Jaeger spreader.

A Maginness Model HGG-4B 3-kw Hi-lectric gasoline engine-driven generator, mounted on the platform of the spreader supplies current to power the vibrators. Vibration frequency can be varied by adjusting engine speed.

The vibrators are controlled from the operator's position by a switch. An outlet is provided for a standard Maginniss Model HCV-3 vibrator for vibrating across transverse joints.

For further information write to the company, or use the Request Card that is bound in at page 18. Circle No. 885.

Plastic Coated Lining For Concrete Forms Gives Improved Finish

■ Concrete with a hard surface, free of fins and smooth enough to paint without special preparation, can be produced by lining forms with a plastic-coated paper and tape, according to Lowe Paper Co. This concern has developed the coated form lining in cooperation with Permacel Tape Corp., New Brunswick, N. J.

Bakelite polyethylene, the plastic coating used, forms a moisture-vapor barrier on the paper and tape to extend the curing time of the covered concrete. This gives the concrete a harder surface. The lining adheres to the concrete after removal of the wooden form, and the form can be re-used.

The coated paper is unrolled, laid over the form, and cut at the junctures of the form and the steel beams. The cloth tape backed with a coating of plastic is used to seal the joints against concrete seepage, as well as to piece together sheets of lining paper.

The coated paper-and-tape lining is recommended for flat horizontal surfaces. For unusually large forms and vertical surfaces, the use of further backing or support is suggested.

For further information write to Lowe Paper Co., Ridgefield, N. J., or use the Request Card at page 18. Circle No. 930.

Small Engine-Driven Generating Plants

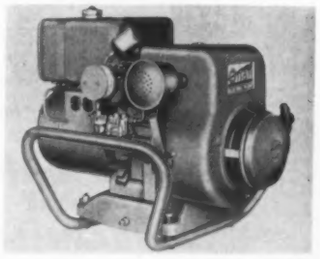
■ A complete new line of small engine-driven electric generating plants ranging in size from 500 to 2,500 watts is announced by D. W. Onan & Sons Inc., Minneapolis, Minn. Powered by an Onan air-cooled four-cycle single-cylinder gasoline engine, the AK models deliver 1.85 hp at 1,800 rpm and the AJ models 2.75 horsepower at 1,800 rpm and 5 horsepower at 3,600 rpm. It is emphasized that the Onan engines used are designed specifically for generator service.

The Series AK is available in sizes of 500 and 750 watts, 60-cycle ac. The Series AJ offers 1,000 and 2,500-watt 60-cycle ac units.

Battery-charging units are available in sizes ranging from 500 to 1,500 watts dc.

For further information write to the company, or use the Request Card at page 18. Circle No. 886.

D. W. Onan & Sons has announced an entire new line of small engine-driven electric plants.



Steel Erection...

Boom lengths up to 80′, with tip extension if required. Optional fluid coupling, power operated drum clutches and direct drive with optional power load lowering, combine to permit smooth, precision work. Truck crane has folding boom for quick, easy moves in traffic.

Drainage Canals...

Faster swings, smoother operation, *plus* self-cleaning crawlers for marshy terrain, add up to more work daily when used as dragline or clam. Low-mount, back-hitch gantry offers all the advantages of high gantry when long crane booms are needed for extra long reach.

ASK FOR A DEMONSTRATION

Gar Wood

SHOVELS·CRANES
TRENCH HOES

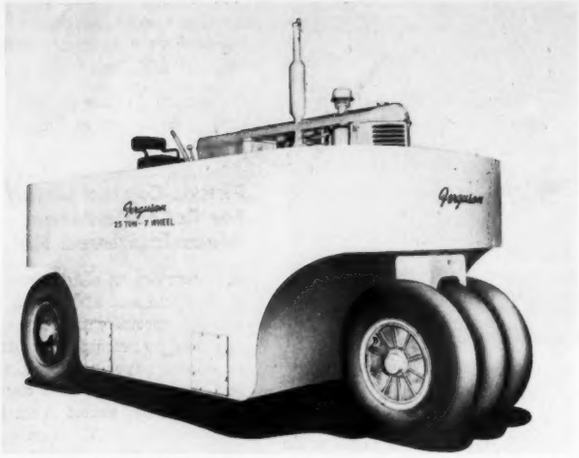
Foundation Borer...

Only Gar Wood offers this new, profit making tool! Combines boring and belling into one streamlined operation for low cost construction of unreinforced foundation footings, caissons, piers, piles, wells, wall supports, etc. Factory installed to order. Completely convertible.

... Distributors throughout the country will gladly show you how Gar Wood performance puts profits in your pocket!

GAR WOOD INDUSTRIES, INC.
WAYNE, MICHIGAN

No. 551



This 7-wheel Model 257 Ferguson roller is one of two new self-propelled compactors announced by Shovel Supply Co. The other is an 11-wheel unit. Both weigh 25 tons fully ballasted. ►

Two New Self-Propelled Rubber-Tire Rollers Are Fast and Easily Maneuvered Units

■ Two new self-propelled rubber-tire rollers have been placed on the market by Shovel Supply Co., 4900 Hines Blvd., Dallas, Texas. The Model 257, equipped with seven wheels, and the Model 2511, with 11 wheels, weigh 25 tons each when fully ballasted with sand.

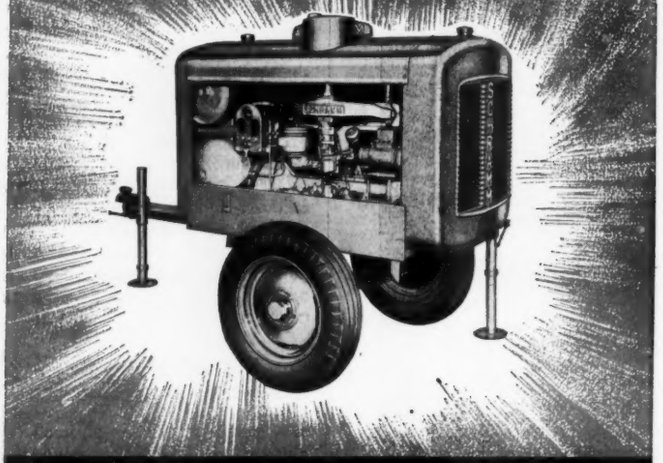
Both rollers are equipped with Minneapolis-Moline 62-hp gasoline or diesel engines and special transmissions providing six forward and six reverse speeds. Operating equally well in either direction, the units eliminate the necessity of turning.

Large-diameter tires designed for high rolling speeds are arranged to conform to U. S. Army Corps of Engineers' specifications, it is reported. Pressures up to 795 pounds per inch of tire width may be obtained. A hydraulic steering mechanism improves maneuverability.

These rollers are suitable for compacting earth, crushed rock, gravel, and similar materials. The 11-tire Model 2511 is particularly effective for rolling asphalt and other paving materials.

For further information write to the company, or use the Request Card at page 18. Circle No. 936.

IT'S NEW!



SCHRAMM 75 C.F.M. AIR COMPRESSOR

NOT JUST SPEEDED UP... BUT... IT HAS LARGER BORE IN ENGINE AND COMPRESSOR!

FEATURES of Schramm's new 75 c.f.m. air compressors include:

* OVERHEAD VALVE ENGINE . . . thus economical in power and fuel
* MECHANICAL INTAKE VALVE . . . with Schramm patented intake valve unloaders
* INTERCHANGEABLE PARTS . . . engine and compressor parts interchange—also interchange with parts of Unistage models 125 engine and compressor.

Write today for Catalog 5501-75

SCHRAMM, INC.
WEST CHESTER • PENNSYLVANIA
SCHRAMMAIR YOUR JOBS

Save time, costs, property...with HYDRALT* ASPHALT (Clay-Type) Coatings

...*"one coat" protection for all around the plant*

Don't let moisture, fumes, smoke and weather attack your property and equipment. Protect your metal and masonry . . . your insulating materials . . . with *one* coat of Flintkote Hydralt.

Yes, even one coat of Hydralt gives thick film, more economical protection against corrosion, rust and the effects of moisture infiltration than 8 or 10 coats of paint. And think of the time savings, too.

Hydralt Protective Coatings are unique (clay-type) asphalt emulsions. Films about 3/64" thickness have provided completely satisfactory resistance to weather in industrial atmosphere for over 24 years.

These Hydralt coatings are reinforced within themselves . . . will not crack, craze, or alligator under exposure. Will not soften or flow under heat. Won't sag or peel off.

They are odorless. Non-flammable to apply by brush, spray or trowel.

Flintkote's line includes the right products for your protective coating needs. For light reflective surfaces . . . Asphalt base Aluminum Paint. For oil or grease resistance...ORTAR† Emulsion Coating.

Want more information about these products? Just write...or look us up in Sweet's.

Over 50 years of specialized experience . . . by phone, mail or personal call. No obligation.

*Reg. U. S. Pat. Off.
†Trademark of The Flintkote Company

Protect structural steel with Flintkote Hydralt Coatings.

Masonry structures resist weather better with Hydralt.

Apply Flintkote Aluminum Paint over Hydralt, for light color.

Protect insulating materials from weather with Hydralt.

Keep moisture out of foundation walls with Hydralt.

Keep dampness out of interiors with Hydralt.

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The Flintkote Company of Canada, Ltd.
In London, England:
Industrial Asphalts Company, Ltd.

Catalog on Fir Plywood Is Quick Reference Source

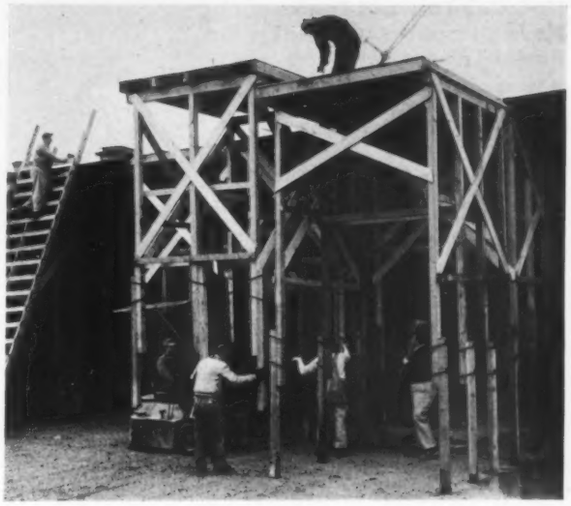
■ A catalog covering fir plywood grades and application data is designed as a quick reference source for builders, architects, and other plywood users. It covers essential data needed in the construction field.

The booklet lists use recommendations by type, and standard stock sizes of both exterior and interior types of plywood most commonly available. It also contains engineering data for plywood sheathing and for plywood used in concrete forms.

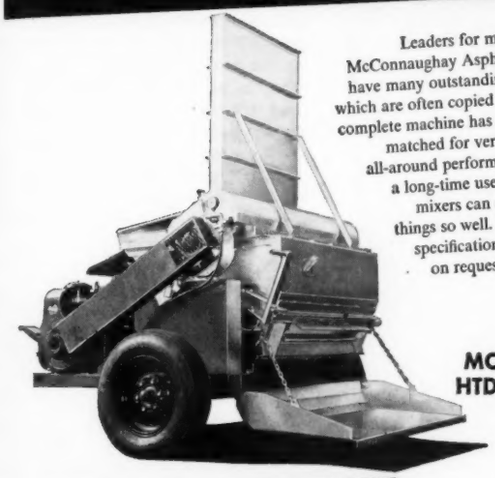
Other information it covers includes minimum FHA requirements, fundamentals of finishing, and applications of specialty products.

To obtain this literature write to Douglas Fir Plywood Association, Tacoma 2, Wash., or use the Request Card at page 18. Circle No. 832

THE PLATOON SYSTEM speeded up construction of approximately 200,000 square feet of floor poured on the Broadway Market Parking Garage job in Buffalo, N. Y. Panels 8 × 8 feet in size, supported by Elis adjustable shores, were built in tower sections, which were then moved into the pouring position by a small Hyster truck. The panels were quickly adjusted to story level. Aisles were left through which the sections could be moved to other parts of the job. The adjustable Elis shores made it easy to lower the panel to clear overhead forms in transport. For further information write to The Elis Equipment Co., 211 N. W. Fourth St., Oklahoma City 2, Okla., or use the Request Card at page 18. Circle No. 895.



Often Copied *but Never Matched*



Leaders for many years, McConnaughay Asphalt Mixers have many outstanding features which are often copied..."but the complete machine has never been matched for versatility and all-around performance," said a long-time user. No other mixers can do so many things so well. Details and specifications (available on request) will show you why.

MODEL HTD-500

McConnaughay
MULTI-PUG ASPHALT MIXERS

OFFER MORE ADVANTAGES!

MODEL HTD-B

McConnaughay Mixers are the result of more than *25 years' active experience* in building mixing equipment and in all phases of the paving industry. Extensive laboratory and field testing assure buyers that these mixers will do the job in practice as well as in theory. Hundreds of the two mixers illustrated are *in active service in 46 States, Alaska, Canada, South America, Europe and Africa.* Designed for fast, economical operation in any climate in any season...they do the job wherever located. That's why customers are our best salesmen. Write for name of user nearest you.

ASPHALT EQUIPMENT CO., INC.
3929 Buell Drive, Fort Wayne, Indiana
National distributors for K. E. McConnaughay, Lafayette, Ind.

THIS can help give you a real competitive advantage on jobs like THIS

New 10,500 ft. runway for heavy bombers at Westover Air Force Base. AJAX Cups imprinted with safety messages and AJAX drinking water equipment were used on this job.

Safety messages *that get read* do help reduce accident rates. The National Safety Council confirms this. And a good safety record *with resultant lower insurance costs* can give you a competitive advantage on today's close-figured jobs.

That's why so many cost-wise contractors are using AJAX safety-imprinted Cups and Drinking Water Tanks.

They not only take fresh, clean water economically to men in the field, but also put approved safety messages right in workers' hands several times a day, at moments when they are relaxed, receptive, ready to read.

A TYPICAL EXAMPLE
(Actual case history from insurance company files)

Contractor A paid a first year premium of $12,748 — $22,600. His second year he paid $9,852 less. $3,700 of this reduction was due to a difference in his manual rate — *but he saved an additional* $6,152 because an active accident prevention program earned him a substantial credit on his second year premium.

AJAX® CUPS and Drinking Water Tanks deliver fresh water to workers — mean less time lost on the job. AJAX Cups and Dispensers are also ideal for stationary tanks, barrels, pipeline faucets. 4 oz., 6 oz. and 7 oz. sizes packed imprinted with assorted stock safety messages — or your own message to order.

GET THE FULL STORY—Write us today for this new folder which gives full details on imprinted AJAX Cups and equipment.

United States Envelope Company
General Offices: • Springfield 2, Mass.
15 DIVISIONS FROM COAST TO COAST

C-2C

New Cab-Forward Trucks Have Compact Cabs That Power-Lift for Servicing

■ Production of a new series of compact cab-over-engine trucks with cabs that power-lift vertically from the chassis for easy servicing has been announced by Mack Trucks, Inc., 350 Fifth Ave., New York 1, N. Y. The cabs lift by operation of a hand pump or by optional hydraulic power.

The Verti-Lift Series D trucks are being built in sizes from 20,000 to 28,000 pounds gross vehicle weight. Tractors in the series range from 40,000 to 53,000 pounds in gross combination weight. The new Mack vehicles are available in four or six-wheel models and in a variety of optional platform lengths.

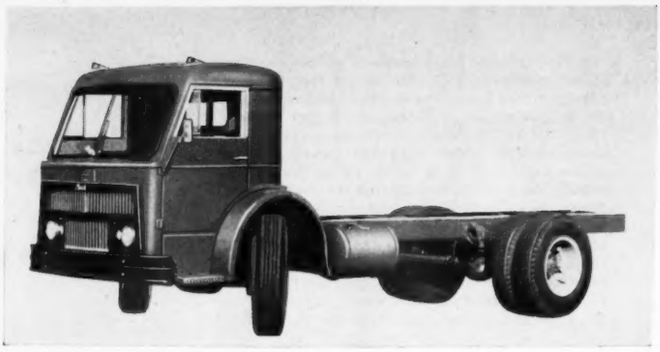
According to the manufacturer, the compact cabs of the Series D models are 12 inches shorter than those of any cab-over-engine unit now offered in the industry, and up to 50 inches shorter than conventional cabs. The three-man cabs are six feet three inches wide and only 68 inches long from the front bumper to the back of the cab. Applied to any body size, the Mack D permits either shorter over-all length or one extra foot for cargo space.

The new models, with wide front axles and large steering wheels, are reported to be easy to handle. Models having a cab-to-rear-axle dimension of 81½ inches and using 9:00×20 tires will turn in a circle 34 feet in diameter.

All controls are of the simple conventional type and are located for driver convenience. An unusually large windshield and full window openings in wide doors give good visibility. Seats are positioned to give the driver a good view forward, downward, and to either side. Also designed to reduce driver fatigue are comfortable seats and a chassis suspension engineered for excellent riding qualities.

The cab-forward D-20 and D-42 models have the same engines and other components that are standard in the Mack line. The standard engine in the D-20 models is the 290-cubic-inch Mack Magnadyne gasoline unit developing 107 brake hp at 2,800 rpm. The D-42 models feature a 150-hp Mack Magnadyne engine of 401-cubic-inch displacement.

For further information write to the company, or use the Request Card at page 18. Circle No. 838.



The new Mack cab-forward D models feature wide front axles, large steering gears, and 22-inch steering wheels. They are reported to be exceptionally maneuverable and easy to handle even in heavy traffic.

Easy servicing of the front of the chassis is one of the features of Mack's new cab-forward Series D. The cab is raised vertically by a hand pump or by optional hydraulic power.

AND NOW the addition of

TORQUE CONVERTER

MAKES THE AUSTIN-WESTERN SUPER 88 THE HOTTEST MOTOR GRADER ON WHEELS

By adding the Torque Converter to the already famous A-W All-Wheel Drive and Steer (Controlled Traction) Power Graders, the A-W engineers have developed the most revolutionary machines in motor grader history—the most remarkable machines to ever "hit" the dirt—Austin-Western Power Graders.

MULTIPLIES torque hydraulically.

HOLDS the load to the power source.

PREVENTS engine lugging or stalling.

APPLIES power to the load smoothly.

INCREASES engine life.

FITS the power to the load more efficiently.

ELIMINATES gearshift "guess."

PROTECTS against shock-load.

REDUCES operator fatigue.

Austin-Western
Power Graders · Motor Sweepers
Road Rollers · Hydraulic Cranes

BALDWIN LIMA HAMILTON BLH
Construction Equipment Division

Manufactured by
AUSTIN-WESTERN COMPANY
Subsidiary of Baldwin-Lima-Hamilton Corporation
AURORA, ILLINOIS, U.S.A.

DUDGEON HYDRAULIC JACKS

SALES RENTALS

CAPACITY TO 600 TONS

FOR:
PILE TESTING
UNDER-PINNING
BRIDGES
PIPE PUSHING
SOIL TESTING

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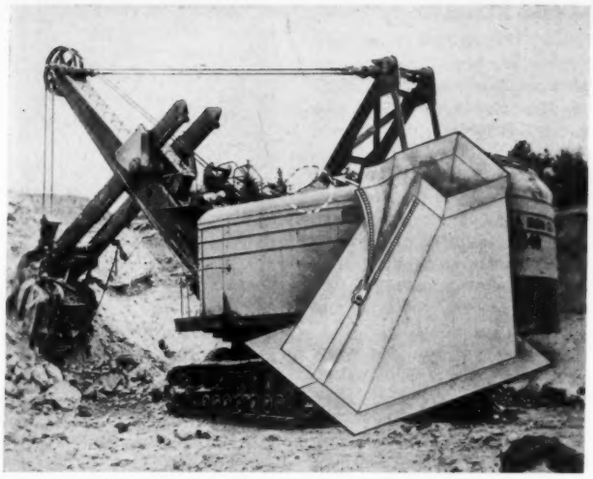


The water-tight Gortite boot in the foreground is used on the gantry leg of the excavator to make a cab opening watertight.

Flexible Zip-On Covers Protect Equipment Parts

■ Pliable sleeves and boots for protecting virtually any part of a construction machine from dirt, sand, mud, water, flame, or cold temperatures are available from A&A Mfg. Co., Inc., 2017 W. Clybourn St., Milwaukee 3, Wis. Fabricated from neoprene-base materials, the new Gortite line of protective covers use one or more built-in watertight zippers, depending on customer's wishes.

The flexible covers are available in a wide range of shapes and contours for use on almost any kind of construction equipment from power shovels and cranes to gyratory crushers. The boot can be used to cover the gantry leg of a power shovel up to the cab opening. This ordinarily admits water which creates electrical hazards.

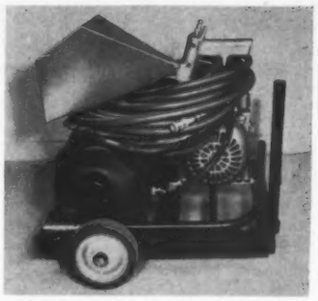
For further information write to the company, or use the Request Card at page 18. Circle No. 840.

Portable Spraying Machine

■ Several improvements have been made in the E-Z-Tex lightweight portable spray unit, according to the manufacturer, E-Z-On Corp., Dept. 2, 1725 W. Pershing Road, Chicago 9, Ill. The unit now offers the operating advantages of a simple stop-and-go trigger switch, a non-clogging spray mechanism, and vital parts made of stainless steel or brass that cannot rust or corrode.

The manufacturer reports that the E-Z-Tex sprayer works equally well with gypsum sand finishes, textured acoustic plaster, exterior stucco, cement or asphalt waterproofing, or texture paints. The machine can be changed over easily from one color to another or from an abrasive coating material to nonabrasive sprays.

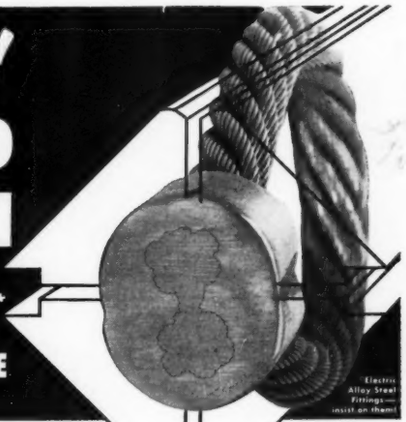
As the sprayer operates, material



from a large stainless steel hopper feeds into the unit's spray chamber, where it joins air under pressure. It is then forced through a tiny opening which forms the spray pattern. The entire unit weighs 130 pounds.

For further information write to the company, or use the Request Card at page 18. Circle No. 872.

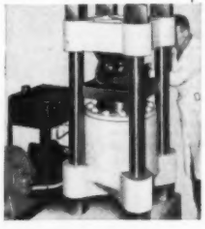
Now!
SOLID FUSION
OF FITTINGS* TO WIRE ROPE



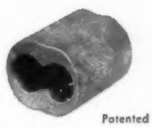
Pat. Pending

Stronger than wire rope itself

In up to 30 seconds, the 4-part dies of the **SKOOKUM-COOKE PRESS** exert equalized pressure on electric alloy steel fitting to force COLD FLOW of metal into wire rope. Result: SOLID FUSION — a stronger, more durable collar than wire rope itself. PLUS: No jaggers! Stronger than handmade! Neater! Takes abrasion better!



SKOOKUM-COOKE (500-ton) COLD FLOW PRESS is available with special 4-part dies for ½" to 1⅛" wire rope sizes. Includes Skookum high standards of manufacture, service and quality.



Patented

THE DUPLEX — formed by simple wire rope return to patented opening. SOLID-FUSION formed in seconds.

STANDARD COLLAR. Farmers or Flemish eye collar forms solidly fused fitting. It's stronger than the breaking strain of the wire rope!

Contact your local Skookum or wire rope dealer.

The SKOOKUM-CO., Inc.
8524 N. CRAWFORD, PORTLAND, OREGON • 647 TERMINAL AVE., VANCOUVER, B. C.
U.S.A. CANADA

BITUMINOUS DISTRIBUTOR
Front or rear mounted for truck or trailer . . . with pressure metering.

MAINTENANCE UNIT
Heating and spraying unit . . . 2-wheel or truck mounted.

SUPPLY TANK
Truck or semi-trailer mounted . . . single or tandem axle.

ROSCO-PACTOR
9 or 13 wheel roller . . . 90 to 125 cubic foot capacity.

ASPHALT KETTLE
2-wheel pneumatic mounted . . . hand or power spray.

a partial showing of the complete

ROSCO LINE

of construction and maintenance equipment for

- HIGHWAYS
- STREETS
- AIRPORTS

Send for "Complete Line" bulletin 54-4.

ROAD SWEEPER
Two way . . . power driven . . . full 4-wheel trailer mounted.

STREET FLUSHER
Truck mounted as shown or 2-wheel model for towing.

STREET CLEANER
Model MBC

Power driven . . . for sweeping or flushing . . . wet or dry. Send for "Complete Line" bulletin 54-4.

Rosco
MINNEAPOLIS

DISTRIBUTORS

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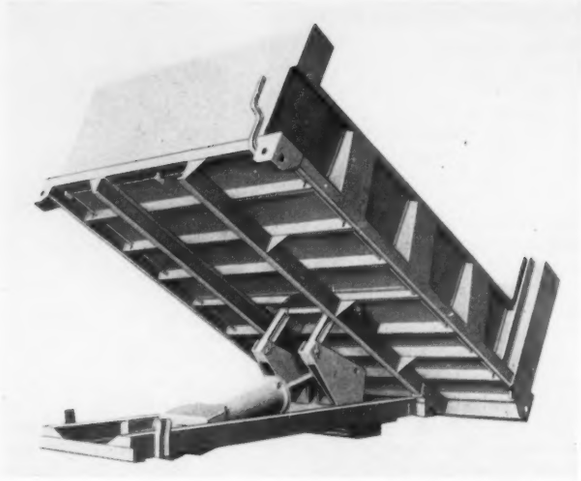
TAR KETTLES

STREET FLUSHERS



The new Flint hoist and dump body.

Hoist and Dump Body

■ A heavily-reinforced hoist and dump body has been announced by the hoist and body division of Flint Tool & Mfg. Co., Holly, Mich., The dump body has 10-inch box-type side braces for strength and rigidity. Including the box-type corner posts, 40 per cent of the body side is reinforced.

The body is tapered 2 inches wider at the rear for faster dumping without sacrificing capacity. The floor is of one-piece construction with a 45-degree angle between the floor and the sides.

The seven sizes of arm-type hoists made for bodies of varying capacities have precision-honed cylinders with a bolted head for easier servicing. The pistons have six rings which are used in pairs for lifting and holding efficiency. Arms and crosshead are rigidly welded into one piece to prevent body side-sway and to maintain equalized lifting thrust on both arms.

For further information write to the company, or use the Request Card at page 18. Circle No. 854.

Two-Wheel Tractor Saw Has Useful Attachments

■ The Little Giant line of self-propelled tractor saws is illustrated in a folder available on request. Gasoline-engine-powered and mounted on two wheels, the mobile saws travel under their own power in both forward and reverse speeds.

The line includes a 22-hp model powered by a four-cylinder Wisconsin Engine. This saw uses blades up to 44 inches in diameter to fell trees up to 5 feet in diameter. A 14-hp model offered cuts trees up to 4 feet in diameter using a 40-inch saw blade.

Special attachments illustrated include a chain saw, a post-hole digger, and a power takeoff for driving pumps, generators, and compressors. Geared 4 to 1, the power takeoff provides 84 horsepower at the power shaft.

To obtain this literature write to Little Giant Tree Feller Corp., P. O. Box 695, Dallas 5, Texas, or use the Request Card at page 18. Circle No. 827.

Pneumatic-Tire Rollers

■ Five models of BMCO pneumatic tire rollers ranging from 9 to 50 tons in size are illustrated in a folder from Browning Mfg. Co., 111 Humble Ave., San Antonio 6, Texas.

Three models with 9, 11, and 13 wheels deliver from 9 to 15 tons of compaction. All are equipped with 7.50 × 15 special wide flat-tread tires. Two other models shown are 35 and 50-ton units.

The front and rear wheels of BMCO compactors are staggered for complete coverage and all oscillate to equalize ground pressure.

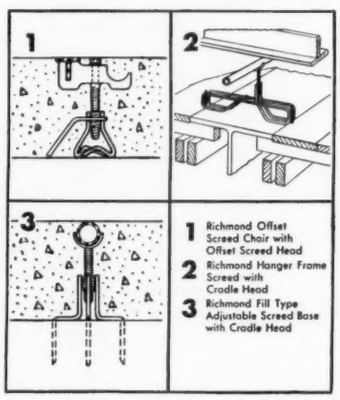
To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 902.

Concrete Finishing Problems Overcome with Richmond Screeding Equipment

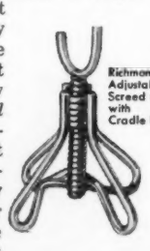
While most concrete work today is thoroughly engineered and scientifically constructed, one of its important phases is often left to haphazard, hand-me-down methods, namely screeding: the finishing of grade floors, runways, roads, decks, approaches, curves, etc. True, the concrete finisher, generally being an excellent craftsman, usually produces a good looking surface. But all too often these surfaces have high or low spots, are not level or of proper thickness, are poorly graded and do not drain properly. This has dire results—particularly when surfaces are exposed to the weather.

Much of the trouble is due to the fact that the screed chairs ordinarily used often do not withstand the loads. Screed chairs serve to support a screed bar or runner at a predetermined position. The bar or runner acts as a guide in striking off the top surface of the slab at its proper elevation and at a proper slope, if a slope is needed. When screed chairs are not properly designed, their legs spread and the screeds misalign and deflect, causing the above mentioned troubles.

These troubles can be eliminated by the selection of screed chairs properly designed for the particular uses for which they are intended—such as the fill-type bases for use where fill requires greater bearing, the sub-grade chair designed for bearing on sub-grade fill, off-set screed chairs designed to take cantilevered loads; and many more. All these are available in the Richmond line of screed chairs.


1
2
3
1 Richmond Offset Screed Chair with Offset Screed Head
2 Richmond Hanger Frame Screed with Cradle Head
3 Richmond Fill Type Adjustable Screed Base with Cradle Head

Richmond's adjustable screed chairs with crossed legs—in wide use by first-line contractors—are fast becoming the most popular. These chairs possess greatly added strength due to the fact that the diagonally opposite legs are not separate, but ingeniously joined and *locked* in place permanently, so that the load is distributed evenly onto all four legs. Since the legs cannot spread, the screeds remain in the position set and the finish produced has no high or low spots, is of even thickness, and level—or properly sloped as intended.



Just how important proper leveling is can be seen, for instance, in bridge work, where the height of the screed bar is often set by surveyors during construction to make sure that the elevations of road curves, bank gradients, etc. are correct. Such leveling to precise dimensions is easily obtained with this Richmond chair. It permits full adjustment of the head up or down, as desired. Once the level is adjusted it will not change. In every way, this chair makes it possible for the contractor to do the job *right*.

Richmond manufactures thirty-four different adjustable supports for screed-finishing. All come with adjustable cradle heads for pipe, flat bar or special shapes, all with top-adjusting combination swivel head for pipe or T-bar.

Write for our 1955 catalogue showing the full line of Richmond-engineered tying devices, anchorages and accessories for concrete construction. It is designed to help you do a quality job *economically*.

If you have a specific problem, Richmond's Technical Division or field men will be glad to solve it for you. Just write: RICHMOND SCREW ANCHOR COMPANY, INC.—816 Liberty Ave., Brooklyn 8, N. Y. or 315 South Fourth St., Saint Joseph, Mo.

GREDAG
All Weather
LUBRICANTS
Insure Lubrication ...on Excavating, Handling and Road Building Equipment
'Gredag' lubricants have been specially developed for the lubrication of outdoor machinery under almost all weather conditions.
Continued use through the years by many equipment manufacturers prove the effectiveness of 'Gredag' lubricants.
Write for FREE Descriptive Folder
GREDAG, INC.
DEPT. 7
NIAGARA FALLS, N. Y.

Here is a sample of the kind of metal debris that the Eriez magnetic sweeper picks up while cleaning roadsides and recreation areas.

Magnetic Sweeper Removes Debris From Roadsides

■ The slow and tedious process of cleaning up roadsides and other areas by hand can be supplanted by the 36-inch magnetic Super Sweeper made by Eriez Mfg. Co., 420 Commerce Bldg., Erie, Pa. Equipped with an Alnico V magnetic element, the sweeper pulls ferrous objects out of loose gravel, sand, and grass.

The Eriez nonelectric magnetic Super Sweeper comes in four sizes and in three magnetic strengths. Available with all attachments for manual use, the sweeper can also be hitched to trailers. All models have puncture-proof tires, roller-bearing wheels, and removable steel handles.

For further information write to the company, or use the Request Card at page 18. Circle No. 853.

Steel Concrete Forms For Walls and Floors

■ The many types of Atlas Speed Forms available are described in a folder from Irvington Form & Tank Corp., 20 Vesey St., New York, N. Y. The steel forms, which are made in 4 to 10-foot lengths, feature a special fast wedge clip bolt devised to speed erection and stripping.

Among other advantages listed are that the forms will not swell, buckle, or expand in rain or snow, and are easy to store. As many as 400 re-uses are reported for the forms, and their cost is said to become comparable to that of wood forms with as few as four uses.

To obtain this literature write to the company, or use the Request Card that is bound in at page 18. Circle No. 890.

Booklet Shows Line Of Air Compressors

■ A new catalog shows all 40 available models of Le Roi portable compressors. It includes a quick-reference chart that shows capacities, engine types, and mountings offered.

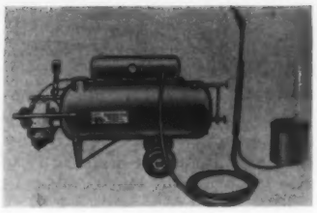
Airmaster features described are replaceable cylinder sleeves, interchangeable valve parts, aircraft-type compressor cylinders, heavy-duty industrial engines, and magneto ignition.

To obtain Catalog CG-9A write to Le Roi Division, Westinghouse Air Brake Co., 1706 S. 68th St., Milwaukee 14, Wis., or use the Request Card at page 18. Circle No. 889.

Portable Steam Cleaner Removes Equipment Grease

■ The Siebring steam cleaner operates under a pressure of 100 to 150 pounds to remove hardened grease from equipment. With a 60-gallon capacity, the Model 401-A cleaner operates 4 to 5 hours at one filling. A Honeywell automatic control, which can be set to maintain any pressure from 5 to 150 pounds, keeps steam pressure constant.

Safety features include a safety pop valve, water gage, steam gage, and safety plug. The unit's automatic jet-type oil burner plugs into a 110-volt ac line. A torch-type burner is also available for independent operation. The cleaner is mounted on rubber or steel wheels for portability.



The Siebring Model 401-A steam cleaner.

For further information write to Siebring Mfg. Co., George, Iowa, or use the Request Card at page 18. Circle No. 899.

Pamphlet in Portuguese Illustrates Excavators

■ A pamphlet written in Portuguese briefly explains the value of individual design found in each model in the Bucyrus-Erie line of ⅜ to 4-cubic-yard excavators.

Among advantages cited are: steady high output on digging or loading jobs, faster digging cycles, lower maintenance costs, and longer machine life. Field photos of each size of machine are included in the illustrations.

To obtain Booklet S-21-EP write to Bucyrus-Erie Co., South Milwaukee, Wis., or use the Request Card at page 18. Circle No. 815.

Wolverine Contractors know how to get more work out of equipment—use STANOLUBE HD-M Motor Oil

Norris Host (right), President of Wolverine Contractors, Inc., and Robert Larsen, Standard Oil automotive lubrication specialist, talk lubrication on job site. Customers of Bob's like to talk lubrication with him. They know it can pay off for them in better, lower cost operation of equipment. Bob's seven years' service with Standard Oil gives him a solid background of experience for this sort of work.

Wolverine Contractors, Inc., Detroit, know that good maintenance begins with good motor oil. They have used STANOLUBE HD-M Motor Oil for many years in both gasoline and diesel equipment. On overhauls, engines come down clean and free of sludge. These are the reasons STANOLUBE HD-M delivers this clean, sludge-free performance:

1	STANOLUBE HD-M Motor Oil is refined from high quality base stock.
2	Additives exclusive with STANOLUBE HD-M retard oxidation of the oil, reduce formation of piston and ring belt deposits.
3	These additives in STANOLUBE HD-M prevent fuel from forming varnish and sludge.

STANOLUBE HD-M makes the maintenance job easier for maintenance men by: extending periods between overhaul; making the overhaul job easier when it is done; reducing wear and eliminating corrosion of bearing metals. STANOLUBE HD-M Motor Oil makes the construction job more profitable for the contractor by helping him get more operating hours out of equipment.

Get the facts about STANOLUBE HD-M Motor Oil. Get in touch with your Standard Oil automotive engineer. In the Midwest call your nearby Standard Oil office. Or contact Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

Dozer helps with grading on Wolverine Contractor project. As with all equipment Wolverine operates, this dozer gets Standard Oil lubrication exclusively.

STANDARD OIL COMPANY
(Indiana)

STANDARD

Stud-Welding Booklet Has Simple Ordering System

■ A new booklet from KSM Products Inc., Stud Welding Division, Merchantville 8, N. J., contains information on the application of studs and stud-welding equipment. The literature has ordering instructions and engineering data on welding studs, pins, and pads.

The ordering procedure explained is designed to prevent errors.

Material analysis, mechanical properties, thread sizes, plating, and annealing information is also supplied.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 910.

THIS TRADEMARK IDENTIFIES THE MORSE-STARRETT Wire Rope Cutter

MORSE-STARRETT PRODUCTS CO.
MORSE-STARRETT
MODEL NO. 1 MO-ST PAT. NOS. 1743404 1769001
REG. U.S. PAT. OFF.
CABLE CUTTER
OAKLAND, CALIFORNIA, U.S.A.

EASY
No special skill is required in the hammer-blow operation of this perfect wire rope cutting tool.

CLEAN
The cut is clean, smooth, without jagged ends; the wire rope is easy to thread or splice.

FAST
Ten Seconds, or less, is the usual time required to complete the smooth, clean cut.

SAFE
The operator is safe, because the blade is enclosed and locked in the body of the tool.

SEE YOUR DEALER OR WRITE DEPT. "M"

MORSE-STARRETT PRODUCTS COMPANY
1204 - 49th AVENUE OAKLAND 1, CALIFORNIA

MARVEL Synclinal FILTERS

SUMP TYPE (Cutaway)

For Efficient Filtration of-
Hydraulic Oils
Fire-Resistant Hydraulic Fluids
Coolants — Lubricants
Water

PROTECT EQUIPMENT
INCREASE OPERATING TIME
REDUCE MAINTENANCE

Marvel Synclinal Filters installed in sump or on line preceding pump offer maximum protection on all hydraulically actuated and other low pressure circulating oil systems. Maintenance and operating costs are reduced because Marvel Synclinal Filter's BALANCED design offers greater ACTIVE filtering area with sufficient storage capacity for filtered-out damaging particles; thus, longer periods of operation are attained at minimum "down time" due to maintenance and repairs.

LINE TYPE (Cutaway)

CONSTRUCTION ENGINEERS and MAINTENANCE MEN whose job it is to keep machinery operating at peak efficiency and who have recognized the superiority of Marvel Synclinal Filters in the filtration of hydraulic oils, fire-resistant hydraulic fluids, coolants, lubricants, etc. are specifying Marvel Synclinal Filters on all new equipment and standardizing with Marvel Synclinal Filters on all existing equipment. Another outstanding reason for their preference is the simple construction which allows Marvel Synclinal Filters to be easily disassembled, thoroughly cleaned and reassembled, on the spot, by any workman, in a matter of minutes. Line type operates in any position and may be serviced without disturbing pipe connections. OVER 550 ORIGINAL EQUIPMENT MANUFACTURERS INSTALL MARVEL SYNCLINAL FILTERS AS STANDARD EQUIPMENT!

VISIT OUR EXHIBIT
Booth #802
at the 6th National MATERIALS HANDLING EXPOSITION
International Amphitheatre
CHICAGO, ILL.
MAY 16-20, 1955

A SIZE FOR EVERY NEED

Available for sump or line installation in capacities from 5 to 100 G.P.M. Greater capacities may be attained by multiple installation (as described in catalog.) Choice of monel mesh sizes range from coarse 30 to fine 200.

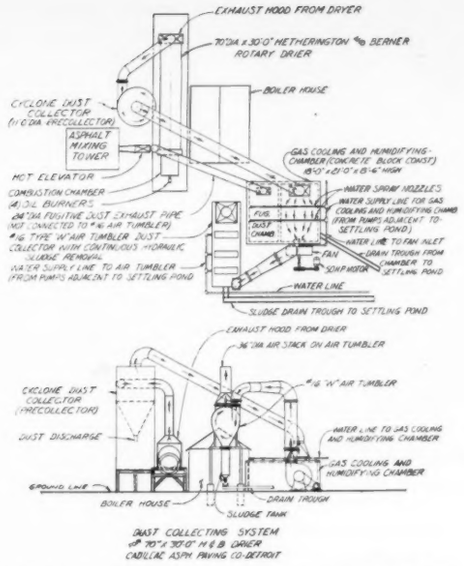
Immediate Delivery
As in the past, Marvel continues to offer IMMEDIATE DELIVERY.

Catalogs containing complete data available on request

MARVEL ENGINEERING COMPANY
625 W. Jackson Blvd., Chicago 6, Ill. Phone: Franklin 2-4431

Without obligation, please send me complete data on Marvel Synclinal Filters, as indicated:—
☐ Catalog #106—For Hydraulic Oils, Coolants and Lubricants
☐ Catalog #300—For WATER
☐ Data on Filters for Fire-Resistant Hydraulic Fluids.

Name .....
Title .....
Company .....
Address .....
City .....
State ..... (CE-5)


EXHAUST HOOD FROM DRYER
70'DIA x 30'0" METHERINGTON & BERNER ROTARY DRIER
BOILER HOUSE
CYCLONE DUST COLLECTOR (11'6"DIA PRECOLLECTOR)
ASPHALT MIXING TOWER
GAS COOLING AND HUMIDIFYING CHAMBER (CONCRETE BLOCK CONST.) 45'0" x 21'0" x 15'-6" HIGH
HOT ELEVATOR
COMBUSTION CHAMBER
WATER SPRAY NOZZLES
WATER SUPPLY LINE FOR GAS COOLING AND HUMIDIFYING CHAMB (FROM PUMPS ADJACENT TO SETTLING POND)
FUEL
DUST CHAMB
FAN
WATER LINE TO FAN INLET
DRAIN TROUGH FROM CHAMBER TO SETTLING POND
SOAP MIXER
WATER LINE
SLUDGE DRAIN TROUGH TO SETTLING POND
EXHAUST HOOD FROM DRIER
36"DIA AIR STACK ON AIR TUMBLER
CYCLONE DUST COLLECTOR (PRECOLLECTOR)
DUST DISCHARGE
WATER LINE TO GAS COOLING AND HUMIDIFYING CHAMBER
GAS COOLING AND HUMIDIFYING CHAMBER
GROUND LINE
BOILER HOUSE
DRAIN TROUGH
SLUDGE TANK

DUST COLLECTING SYSTEM @ 70'x 30'0" M & B DRIER CADILLAC ASPH. PAVING CO. DETROIT

A drawing of the dust-collection system installed on Cadillac Asphalt Paving Co.'s hot-mix setup in Detroit.

Asphalt plant works within city

Asphalt plant owners with dust-control problems might take a cue from Cadillac Asphalt Paving Co., Detroit, Mich., which today operates its plant with dust emission well below the limit specified by the Detroit bureau of smoke control.

Previous to installing a new dust-collecting system, the company's asphalt setup, located in the heart of the city, churned out a very fine and light dust, much of which was picked up by air from the dryers. The dust load at the dryers was heavy—between 18 and 20 grains per cubic foot of air—and the Detroit code specified a maximum load of only 0.3 grains per cubic foot of air.

After unsuccessfully trying to lick the problem in a number of ways, Cadillac installed a system using the Dust Supression & Engineering Air Tumbler. Once the system was operating, tests made at the plant by inspectors from the city smoke-abatement bureau showed that emission from the stack was about one-tenth the permissible amount, or 0.032 grains per cubic foot of air.

Plant Layout

Cadillac's asphalt setup actually consists of two plants—each complete in itself—plus an additional dryer for pre-drying aggregate. The larger of the two plants is a 180-ton-per-hour

ANNOUNCING . . . The most revolutionary achievement in ARC WELDING equipment in years!

BREN-WELD MODEL 200 AW

Dimensions: only 11" x 12" x 7½"

Weighs only 65 lbs.— Carry it to the job!
Patent Pending

FIRST TRULY PORTABLE 200 AMP. OUTPUT ARC WELDER

OBSOLETES ALL OTHER WELDERS OF COMPARABLE RATING

List Price $169.50 F. O. B. Long Island City, N. Y.

Sensational new transformer development produces far more power to pound! The BREN/WELD does work of conventional welders 4 or 5 times its size and weight . . . Actually delivers up to 250 amps at reduced duty cycle.

Simple to use, fully guaranteed, it operates on 110/220 volts AC, 50/60 cycles; handles electrodes from 3/64" to 5/32". Has adjustable arc voltage for different arc characteristics. Ideal for plant production and maintenance, for construction work, railroads, on the farm or home.

See your dealer or write direct for details of free trial offer!

24 hour delivery from stock!

KASSON

Manufactured by BRENNEN, BUCCI & WEBER, INC. New York City

SALES DIVISION
KASSON DIE & MOTOR CORPORATION
Integrity Since 1919
32-14 NORTHERN BOULEVARD, LONG ISLAND CITY 1, N. Y.

Air flow from the dust intake to the clean exhaust is indicated by arrows in this cutaway view of the Air Tumbler.

...within city's air-pollution code

Company installs system using water to trap dust as both are whirled together by centrifugal force

unit; the smaller plant has a capacity of 90 tons per hour. Both use 2½-ton mixers. The large-capacity plant has two mixers located one above the other. These operate in series and give the plant double the capacity of the smaller unit. At top capacity, this plant loads a 12½-ton truck every three minutes.

Once aggregate is stockpiled at the plant by rail or truck, it is moved through the plant system entirely by conveyors and elevators. The stockpile feeds material to a 250-foot-long and 8-foot-diameter underground tunnel through chutes and gates. From here, material is taken by conveyor to the pre-dryer, where moisture content is reduced to as little as one-half of one per cent. Leaving the pre-dryer, aggregate is taken to one of seven storage bins, each of which has a capacity of 1,800 tons. From these bins, aggregate is fed to the two plant dryers for the final processing operation.

Dry material is delivered directly to the mixing-plant dryer by bucket elevator and conveyor belt. Of the several materials used—natural sand, limestone, dolomite, gravel, slag, and 6 per cent fly ash—all but the last are usually pre-dried.

The pre-dryer in the large plant is a Hetherington & Berner unit, 88 inches × 32 feet. The dryer in the small plant, also a Hetherington & Berner, measures 70 inches × 30 feet. All are fired by No. 5 and No. 6 fuel oil, and use between 2½ and 3 gallons of oil per ton of aggregate.

As the twice-dryed aggregates are screened, classified, weighed, and delivered automatically to the pugmill of the larger plant, oil is added and

(Concluded on next page)

Frederick

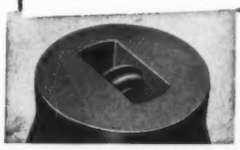
CAST SEMI-STEEL

BALLS

Your low cost production tool for

■ wrecking old buildings ■ smashing scrap metal

■ smashing old paving ■ secondary quarry breakage



Exclusive E-Z SWING steel eye, deeply imbedded in ball, gives better control; more cable protection. Special Release Hooks for "free dropping" also available.

Tough and rugged, they're made to stand abuse without maintenance cost. Made in sizes to suit your needs. Prompt shipment F. O. B. Frederick, Md., from stock. Write today for free illustrated literature and prices on Frederick Balls and Weights that save your production costs.

SIZES AND WEIGHTS SHIPPED FROM STOCK		
500 lbs. (ball-shaped)	2000 lbs. (ball-shaped)	5200 lbs.
1000 lbs.	3300 lbs.	6500 lbs.
1500 lbs.	4000 lbs.	8000 lbs.

MAKERS OF MANHOLE FRAMES, COVERS AND STEPS
• STORM GRATINGS • METER FRAMES AND COVERS
• CENTRIFUGAL PUMPS • GRAY IRON CASTINGS

FREDERICK IRON & STEEL, INC.
FREDERICK, MARYLAND

Speed Up your work! **Arc Welding** does it BETTER at LESS COST

Speed up your work and cut welding costs with Hobart Gas Engine Drive Arc Welders. You'll avoid time-consuming breakdowns that delay the job and roll up the costs. They can be used anywhere to fabricate steel or repair and maintain equipment. No need for power—they provide their own. And there's a type and size for every construction job.

For extra heavy duty welding, contractors favor the Hobart DC Gas Drive Welders ranging up to 600-ampere capacity, with many combinations of auxiliary power.

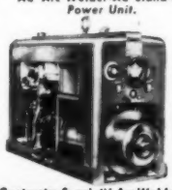
Others like the combination AC Arc Welder and AC Stand-by Power Unit. Welds or powers lights, tools.

Many contractors are standardizing on the 250-amp "Contractor Special." A full capacity 250-ampere welder, compact and lightweight for easy moving from job to job.

Yes, Hobart has an arc welder for every application—check and return the coupon today for complete details!

Heavy Duty Gas Drive DC Arc Welder with many combinations of auxiliary power.

AC Arc Welder-AC Stand-by Power Unit.



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City of Winston-Salem (N.C.) sweeps downtown walks with their Tennant "75" Sweeper.

sets a new standard in clean, LOW-COST sweeping

In busy downtown areas, where *clean* sweeping counts most, but is costly—a compact TENNANT Power Sweeper pays for itself fast. It not only *does the work of a crew of men;* it sets a new standard for clean work. You'll see the difference.

Sweeping easily around parked cars, its powerful brush-and-vacuum system rapidly cleans a 48" path. Picks up dust, dirt, paper, sand—the usual loose light litter found in gutters, on walks and in alleys. Does a remarkable job.

It's rugged . . . compact . . . easy to use; and superbly engineered for long, dependable service.

Write today for details.

SPECIAL FEATURES

- Sweeps 4 to 8 times faster than by hand.
- Sweeps EXTRA CLEAN; has vacuum dust control.
- Dumps load mechanically.
- Cleans 48" path; can sweep flush with walls, curbs.
- Reverses instantly.
- Steers easily in traffic; has 38" wheelbase.
- Can also be used in PARKING LOTS, RAMPS, GARAGES, etc.

G. H. TENNANT COMPANY
2534 N. 2nd St., Minneapolis 11, Minn.

TENNANT POWER SWEEPERS

SPECIALIZED MAINTENANCE EQUIPMENT

(Continued from preceding page)

the batch is dumped to a second mixer below.

Dust-Collection System

S. G. Hayes, president of Cadillac Asphalt Paving, realized that the predrying of aggregates was the main cause of the serious dust problem. But even after five different wet dust collectors had been tried, the plant was still releasing too much fine material into the air.

Working with Dust Supression & Engineering Co., Lake Orion, Mich., Cadillac installed a system consisting of a cyclone discharging into a cement-block spraying chamber. This cools the gases and humidifies the dust, collecting the heavy portion of the unwanted material.

The system, installed by Marshall Blow Pipe Co., Detroit, uses a fan to draw air from the chamber and discharge it into a No. 16 Air Tumbler. Dusty air enters the Air Tumbler at one end of a pear-shaped barrel, flows at high velocity along a helical air passage formed by a stationary screw, and is discharged at the other end as clean air. The spray chamber, which had been used with previous collectors, was included in the system for an extra margin of safety.

Actually, water introduced in the lower portion of the barrel is picked up by the air stream which is forced to make four complete revolutions around the barrel by the helical air passage. The centrifugal action throws water and dust against the surface of the barrel, where the dust is trapped by the water and carried off into a sludge tank below.

The sludge, which can be removed by manually emptying the tank, by using a mechanical conveyor, or by flushing, is removed at the Cadillac plant by a hydraulic method. The slurry is discharged into a large pond nearby, and when enough material collects, it is removed from the pond by a crane with clamshell and taken away in trucks. Cadillac's system requires no fresh water supply, for water is returned to the Air Tumbler and used again. THE END

American Cyanamid News

Recently appointed as assistant to the manager of the explosives department of American Cyanamid Co., New York, N. Y., is John R. Burkett. Previously, he was with North American Cyanamid Ltd., Montreal, Quebec. Mr. Burkett has been with the company in various capacities since 1935.

This 4-cubic-foot model has been added to the line of tilting plaster and mortar mixers made by Chain Belt Co.

Plaster and Mortar Mixer

■ Production of a new 4-cubic-foot plaster and mortar mixer has been announced by Construction Machinery Division, Chain Belt Co., Milwaukee 1, Wis. The company also makes 2 and 8-cubic-foot models.

The new model is said to be a versatile easy-handling unit. It has a tilting drum, low shoveling height, and a 9½-inch discharge height that makes pouring into the mortar box easy. A bag cutter is conveniently located over the mixing drum.

Four paddles, with properly placed holes, are reported to provide efficient criss-cross mixing action. The discharge lip prevents undue splashing when the drum is tilted. The paddle shaft is mounted on prelubricated bronze bearings, which are protected from mortar and grout by a shaft seal.

For further information write to the company, or use the Request Card at page 18. Circle No. 878.

Facts About the Design of Fuel-Injection Equipment

■ A new booklet from Caterpillar Tractor Co., Peoria 8, Ill., explains what is behind the production and design of efficient fuel-injection equipment.

Among the features discussed in the booklet are interchangeability of parts, ease of maintenance, adjustment-free design, and the ability to burn non-premium fuels.

To obtain Form No. DE580 write to the company, or use the Request Card at page 18. Circle No. 825.

Timken Is Building New Plant in Canada

Construction work has been started on the new rock bit producing facility being built at The Timken Roller Bearing Co.'s plant in St. Thomas, Ontario.

The new building, which will have 5,600 square feet of floor space, will cost about $250,000. Carbide insert rock bits will be produced at the new plant for the Canadian market and for export. The Timken organization, with headquarters in Canton, Ohio, expects production to start at the new facility in September.

this new Berger Polara transit sold itself before it was built

Engineers had only to see the blueprint of this newest addition to the Berger Instrument line to recognize how it fills the need for an all-around utility transit at a moderate price. That's how our production of this instrument was sold out for 60 days before we started to make it.

Polara took years of engineering to develop—with mock-up after mock-up discarded and improvements added until Berger engineers felt it was ready to take on its first field assignments.

It was ready! Surveying results proved it—Polara's design assured it. For the starting point in its development was to retain as many of the features of Berger Engineers' Transits as possible, with appropriate modifications to combine rugged construction, ease of use, and light weight in an accurate, budget-priced, standard 5½" transit. Read the specifications of this unusual instrument. Then let us arrange for the nearest Berger dealer to put it through its paces for you.

Price (without compass) $496....(with compass) $523

PARTIAL SPECIFICATIONS

Standards – Bronze "A" frame with bronze bearings.

Telescope – 10½ in., erecting internal focusing, one piece, cast bronze; 22-power; coated optics, 3 feet short focus. Stadia lines at fixed ratio 1:100.

Horizontal Circle – 5½ in., divided to ½ degrees, with double opposite verniers reading to 1 min.; graduations on corrosion resistant aluminum alloy.

Vertical Circle – Diam. 5 in., one double vernier reading to 1 min. Aluminum.

Telescope Vial – Sensitivity 40 sec.; plate levels (2) 80 sec.

Compass – Water resistant, dustproof, 3 in. needle. Variation ring graduated to ½ degrees; adjustable for declination.

Centers – Repeating centers of long wearing bronze alloys.

Leveling Head – Cast bronze; nickel silver leveling screws fully enclosed, with replaceable bushings.

Mahogany Transit Case, sunshade, 8 oz. plumb bob, magnifier, spanner wrench, adjusting pin and screw driver.

Split leg tripod, straight-grained white ash; tripod head with 3½-8 thread.

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Berger 6¼" Engineers' Transit

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first with engineers

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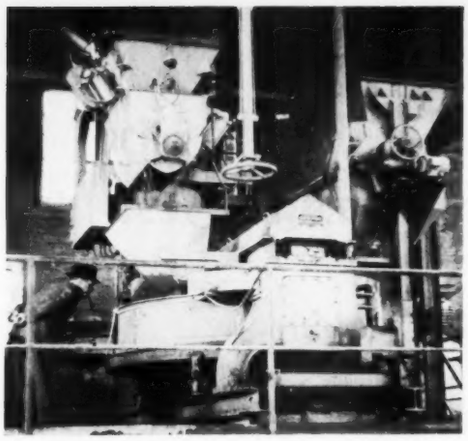

This single-unit Eirich automatic concrete plant produces up to 120 cubic yards per hour of mass concrete. An unusually thorough mixing action reduces mixing time.

Revolving-Pan Mixer Makes High-Strength Concrete In Short Mixing Cycle

■ Operating on a counter-current mixing principle, the imported Eirich mixer is reported to produce high-strength concrete at a saving in cement and mixing time.

Materials to be mixed are placed in a pan revolving in a counter-clockwise direction. Scrapers mounted at an angle near the periphery of the pan direct the revolving materials toward the center where a single or double eccentrically-moving cluster of mixing blades sweep the materials in a clockwise direction.

The result of this thorough mixing action is an equal distribution of all constitutent materials, grain sizes, bonds, and admixtures to produce a homogeneous heavy concrete that is almost free of cavities. Because the material is shifted a number of times in any given mixing cycle, all aggregate is thoroughly coated and the mix is uniformly moistened to produce batches of any desired quality.

Eirich mixers are built in 5, 9, 13½, 30, and 54-cubic-foot sizes. Controls available are manual, push-button, and—for sizes 13½ cubic feet and up—automatic. Also available are automatic concrete plants including mixers, and complete batching and electrical control equipment. A new Eirich twin mixing plant for mass concrete produces up to 240 cubic yards per hour. With a single mixing unit, the plant produces up to 120 cubic yards per hour.

For further information write to Almar Specialty Machines Inc., 156 Blackburn Road, Summit, N. J., or use the Request Card at page 18. Circle No. 937.

It is reported that Saturday is the most dangerous day of the week to drive; and that three out of four accidents involve passenger cars.

Three New Booklets on Four-Wheel-Drive Trucks

■ Three new booklets describing its new 1955 four-wheel-drive heavy-duty trucks have been released by the Four Wheel Drive Auto Co., Clintonville, Wis. Each brochure features a different FWD series. Series 100 includes units with 14,500 and 17,500-pounds gross vehicle weights. Trucks in the Series 200 range from 22,000 to 28,000 pounds gvw, and the Series 300 includes units of 32,000 to 36,000 pounds gvw.

The booklets explain the advantages of the FWD Math-Matic design which gives four-wheel-drive trucks greater driving power and increased load capacity. It does so by proportioning engine torque to weight on the front and rear axles by means of a special power-proportioning center differential. Complete specifications of each truck series are included in the brochures.

To obtain the three booklets write to the company, or use the Request Card at page 18. Circle No. 894.

Piedmont Region Office Opened by Cummins Engine

The newly opened Piedmont regional office of Cummins Engine Co., Inc., Columbus, Ind., is headed by R. R. MacDonald. The Piedmont region consists of the states of Virginia, West Virginia, and North and South Carolina. The new office is located at 601 N. Elm St., Greensboro, N. C.

Mr. MacDonald, former manager of the Cummins Diesel Sales Corp. branch at Milwaukee, Wis., has been with Cummins for a number of years in various capacities.

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Smooth driving... coming and going... via the Paseo Trafficway Bridge

FLEXCELL* EXPANSION JOINT FILLER ASSURES TIGHTER, SMOOTHER, MAINTENANCE-FREE EXPANSION JOINTS

Under-construction view of Paseo Trafficway Bridge project, Kansas City, Mo.

Today's heavily-traveled traffic arteries require joints that are free from bulge and crevice, joints that stay closed and smooth without troublesome, expensive maintenance. And wherever concrete meets concrete, the perfect answer is Flexcell Bituminous Fiber Expansion Joint Filler.

Under severest traffic and climatic conditions, tough, durable Flexcell Expansion Joint Filler has proved a cost-saver in years of on-the-job efficiency. The reason is the extreme resiliency of its rugged cane fiber board core. When the concrete expands, Flexcell Expansion Joint Filler compresses without extruding; as the concrete contracts the filler springs back to normal, keeping joint neatly and smoothly closed. Laboratory tests prove that after compression to 50% of original thickness there is a "recovery" of over 70%.

Low in initial cost of both material and labor, Flexcell Expansion Joint Filler is easy to work with, provides finished joints without trimming. It is impregnated with a durable asphaltic compound to resist moisture, and is protected against dry rot and termite attack by the patented Ferox® Process. Will not become sticky in hot weather, brittle in cold weather. Its rough-textured surface makes a firm bond with concrete. It is ideal for work involving special cutting, tapering, fabricating.

Leading engineers, contractors, architects . . . many other Federal, State and Municipal agencies—all have long specified Flexcell Expansion Joint Filler. *You'll* profit by investigating the advantages of this widely-preferred filler . . . *before* you start your next job.

Mail the coupon below for full data on the benefits and economies of using Flexcell Bituminous Fiber Expansion Joint Filler for pavements, runways, sidewalks, curbs, gutters, driveways, concrete floors and roof decks. No obligation!

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The Celotex Corporation, 120 S. LaSalle Street, Chicago 3, Illinois

*Flexcell is a Trademark identifying Bituminous Fiber Expansion Joint Filler marketed by The Celotex Corp.

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120 S. LaSalle St., Chicago 3, Illinois

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Working in one of the two caliche pits near the east end of the 20-mile-long project, a Bucyrus-Erie 38-B shovel using an Esco 1½-yard dipper loads a Koehring Dumptor for the haul to the aggregate plant. One 38-B and four Dumptors worked each borrow pit.

Long caliche base laid in West Texas

by RAY DAY

Caliche base, traditionally used in west Texas as a means of transferring pavement loads to the subgrade, has been employed in modern form on a 20-mile road-rebuilding job on U. S. 62 from the city limits of El Paso eastward. Hugh McMillan, El Paso contractor, had the $480,000 contract with the Texas State Highway Department. The big project, completed last January, is the second McMillan has done recently in that area; the east limit of the job joins a 4½ mile mountain section which the contractor rebuilt last year.

With the exception of about 7,000 feet which was given an extra truck climbing lane through the foothills, the entire 20-mile job consisted of two-lane construction. The new work, however, was built to the best modern standards to allow for 18,000-pound wheel loads.

Since the old road was generally on permanent alignment, the contractor ripped up the old bituminous surface, stockpiled the old subbase material temporarily, machine-graded the subgrade to new standards of sight distance, and then relaid 5 inches of the old base material before putting on 6 inches of new caliche subbase. All of this created somewhat of a problem in that this stretch of U. S. 62 passes through deep sandy country and it was necessary to carry automobile traffic through the job while the work was in progress.

Principal quantities included 1,033 cubic yards of rock excavation, 220,000 cubic yards of grading, 2,600 cubic yards of channel excavation, 126,680 cubic yards of flexible caliche base, and 1,427 tons of asphalt surfacing.

Grading Gives Trouble

Preparation of the old roadbed turned out to be one of the most troublesome parts of the project. For work purposes, the new construction section was divided into a series of stretches approximately 3,000 feet long. It was necessary, of course, to scarify the old asphalt pavement, stockpile the subbase, carry traffic through, and then get the new base started with all this activity in progress. The problem centered around the tendency for automobiles as well as construction machinery to bog down in the dry sand once the old subbase had been removed.

The situation was a troublesome one until McMillan brought in a new Bros 50-ton pneumatic roller. This unit was used immediately on the disturbed sand, along with water equipment to compact the material to such a density that its bearing value would carry traffic. The machine-grading item also required an enormous amount of water. Fighting a 15-mile maximum haul, the contractor used from three to eleven water trucks, ranging from 2,000 to 4,600-gallon capacity, to haul up to

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to Investigate Underground Conditions
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- *Western Contracting Co.
- *Williston Shell Rock Co.
- *80% of State Highway Departments.

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It's better to be safe—rather than sorry when making a bid. It costs so little with a Mobile Drill. Be sure—get your sub-soil information the Mobile Drill way! Write for full information—no cost or obligation.

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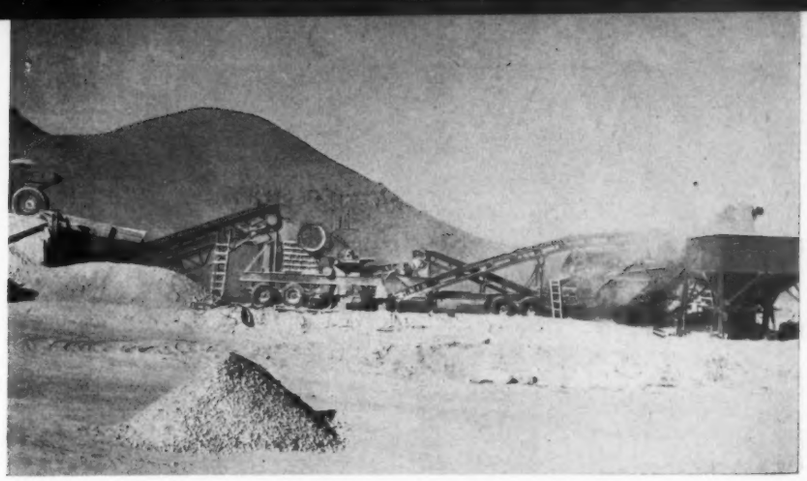
DOWN GO FIELD EXPENSES!

Expenses are cut to the bone when you have Omaha Dragline Buckets on the job. Forty-five years of experience and improvement produce Omaha buckets built to last in the field. These buckets are reinforced at points of strain to stand up under the toughest jobs. Time and dollar consuming field repairs are reduced. Write now for complete catalog giving specifications of 4 available types.

OMAHA DRAGLINE BUCKETS

DRAKE-WILLIAMS MOUNT • OMAHA, NEBR.

Well-known road method used as U. S. 62 is rebuilt to new standards east of El Paso



This Pioneer 40-V portable rock plant reduces the raw caliche to 1½-inch-minus size for use in the base. A Dumptor delivers a load of raw material to a conveyor at left. Trailers load at the transfer bin (right) for the haul to the road.

140,000 gallons of water per day.

In September, about a month after the job had been started, the elements gave McMillan a break. That particular section of west Texas seldom has a good rain, but during the month of September the heaviest rainfall in 20 years was measured. The rain thoroughly saturated the sandy borrow pits to a depth of about three feet. That unexpected but welcome downpour represented a sizable saving in water-hauling cost, and it also had the advantage of distributing moisture uniformly through the borrow material.

McMillan assigned four Caterpillar No. 12 motor graders to the ripping operation, and used two tractor-drawn scrapers to pick up the existing caliche subbase and stockpile it temporarily to one side of the highway. As soon as the machine-grading had been finished in a given section, the dirt was rolled down tight by four small Bros pneumatic rollers and the Bros 50-ton compactor. Then the old caliche base was brought back in, blade-mixed with moisture, and rolled down by the same method.

Crusher for Base Rock

Acceptable caliche for the new subbase was none too plentiful. Considerable exploration had been done by Texas state highway engineers, who found two acceptable pit sites near the east end of the job. One of

(Continued on next page)

200,000 LB. CAPACITY

concrete tester

CUBES ● CYLINDERS ● BEAMS

COMPACT and PORTABLE Entirely self contained. No electrical or pressure connections required.

ACCURATE Meets ASTM and AASHO specifications for hydraulic concrete testing machines.

SIMPLE OPERATION Hand operated, quickly and easily, as photo shows. Large, direct reading, dial indicates results of test.

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Power Products Corporation

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On the road, a Schonrock 10-yard cable-controlled trailer pulled by a Ford Big Job truck dumps a load of crushed caliche, while another truck-drawn trailer waits to dump just ahead. One side of the road is kept open for traffic during the job.

(Continued from preceding page)

the pits was on a high bench about three miles from the eastern end of the project, while the other was in a flat area about four miles from the east end. These locations meant that some of the caliche had to be hauled 16 miles to the El Paso end.

The caliche formation was the typical calcareous lime found in that section of the state, and was so solid that it had to be drilled and shot. A Gardner-Denver wagon drill, supplied with air from a Gardner-Denver 500-cfm compressor, was used for the powder holes. Approximately 1 pound of explosives for 2 yards of the material was sufficient to break it up properly.

The pit setup was typical in both locations. It consisted of a Bucyrus-Erie 38-B power shovel, equipped with an Esco 1½-yard dipper, and four Koehring Dumptors which hauled the material from the pit to the crusher. A Pioneer 40-V portable rock plant was used for reducing the raw material to the necessary 1½-inch-minus size which Texas State Highway Department specifications required.

In being processed by the plant, the material passed first over a bottom-deck screen, which separated any fines already acceptable. The remaining oversized material then passed by closed circuit to the jaw and roll crushers, and over the screen decks. A stacker conveyor delivered all the acceptable material to a 30-ton surge hopper, beneath which the trucks loaded for the haul. Rented dump trucks were used at first, but McMillan later entered into a subcontract arrangement whereby ten Schonrock 10-yard cable-controlled trailers were used with Ford Big Job trucks. This equipment was much more satisfactory, and was used throughout the second half of the job.

Processing Caliche

Caliche under most conditions makes a good subbase. It does the job better, however, if it is processed, blended, and watered so that field conditions approach as closely as possible all laboratory optimums. To get this result, it is necessary in the field to dump the material carefully, to use special attention on blade-mixing so that a good blend is developed, and to put in the correct amount of moisture as this is going on. In between, of course, there is the problem of carrying automobile traffic through the operation.

McMillan solved his problem by dumping caliche for half the road width in a windrow far over to one side just off the quarter point. The

Here are the facts about U. S. Giant's superior construction:

U. S. Giant has a *smooth* bore with a rubber tube of special quality, protecting the wire from rust, acid, or other deteriorating elements. Whether it's suction or discharge, it's all the same to U. S. Giant—the job gets done quickly and efficiently.

Strong though it is, U. S. Giant is surprisingly flexible and easy to handle. If flattened in service, it is easily rounded out. The cover is of tough stock, abrasion-resistant and long-lasting.

You can depend on U. S. Giant Hose to do its part on *any* water suction or discharge job in any weather, under the worst working conditions.

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Schonrock trailers dumped under the control of a spotter, who used a chain for horizontal distance and scale weights for quantity. In addition, the trucks were loaded under the surge hopper, so that each load approximated the 10-cubic-yard water-level capacity of each rig. All these factors made it easy to dump the right volume of material.

Four motor graders, all Caterpillar No. 12's, were used on the blade-mixing operation, which started out with leveling of the pile preparatory to the first application of water. While half the road stayed open to traffic, the motor graders worked the material over the other side of the work, chiefly by rolling the windrow back and forth. It was considered especially important to get the moisture evenly distributed. Field men have noticed, in fact, that segregation never ends completely until enough water has been added to hold the particles together. Dry caliche simply separates and refuses to blend.

Immediately following the proper moistening and blending, the motor graders laid up the material by cutting repeated segments out of the windrow and blading the material from one side to the other. Working with the graders were four Bros rubber-tire rollers, drawn by Case and International rubber-tire tractors. The subbase material was compacted to within 95 per cent of modified AASHO density, and sealed by applying a 10 per cent asphalt emulsion mixed near the job and supplied to the site by one of the water wagons. Traffic was then routed over this half of the road while the same process was repeated on the other half.

A Standard asphalt plant, set up at the westernmost caliche pit, was used for the plant-mix. Mineral aggregates were supplied by the Pioneer rock plant set up at that location, and approximately 75 per cent of the material for the eastern section was mixed by that plant. McMillan also has a commercial hot-plant setup in El Paso, and since the mixing and hauling for the west end could be done at less cost from that location, the El Paso setup was employed. The job was closed up tight continuously so far as keeping the new caliche base covered with plant-mix surfacing was concerned. No long stretches were left exposed to traffic after they were sealed.

Field operations for Hugh McMillan were supervised by Rex Thrasher, who worked closely with Texas State Highway Department engineers under District Engineer E. W. Mars of the El Paso office. THE END

Once the caliche has been heavily saturated with water, a Caterpillar No. 12 motor grader begins the blade-mixing operation. Mixing is done by rolling the windrow of material back and forth, moisture being added as needed.

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WEIGHS ONLY 9 LBS.

"The Lug-All, dollar for dollar, is probably the best tool used in our outfit. In a business of expensive tools and equipment, it is a real pleasure to get a man-sized working return for a boy-sized expenditure. Our Lug-All is kept constantly on the job and in the shop and has been put to a thousand different uses" states Mr. R. L., president of a prominent contracting firm.

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RUGGED FRAME—fully protects the drum and ratchet teeth, yet permits easy cleaning of simple parts.

REVERSIBLE HANDLE—is "safety valve" handle that will bend if seriously overloaded.

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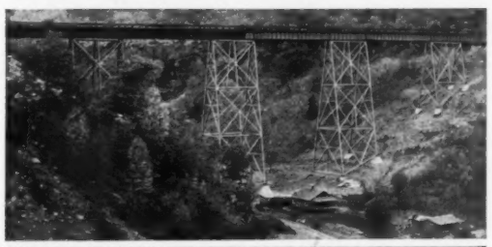

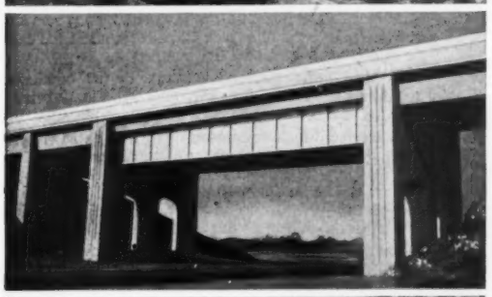

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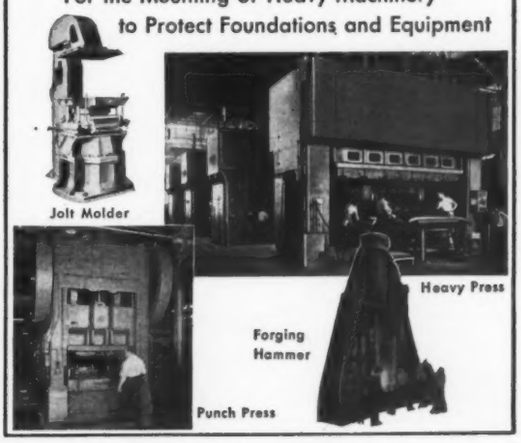
FABREEKA PADS on bridges distribute loadings evenly and compensate for irregularities of bearing surfaces. They also prevent chipping and flaking of concrete and grout, seal out moisture and dirt, reduce transmission of impact shock, and very substantially cut the labor cost of erection. Bridge building contractors find them more economical and convenient to install. Furnished cut to size with bolt holes as specified, Fabreeka Pads are simply dropped over the anchor bolts; require no painting, and are not affected by weather conditions. They are made of a scientifically designed and manufactured material, have exceptionally high damping qualities, and remain permanently resilient under all service conditions.

FABREEKA Pads

For the Mounting of Heavy Machinery to Protect Foundations and Equipment



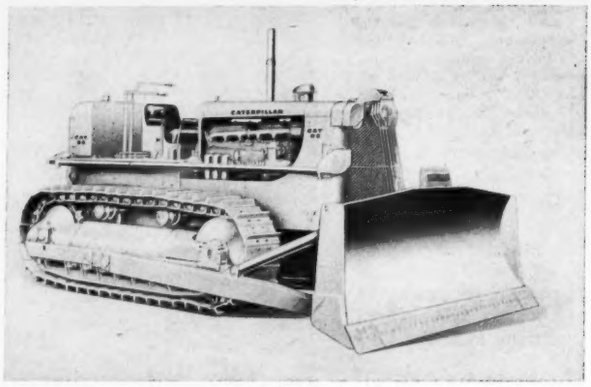
Be sure to investigate the use of Fabreeka on the next Bridge you design or build . . .
Write for engineering data on the application of Fabreeka to Bridges and Under Heavy Equipment

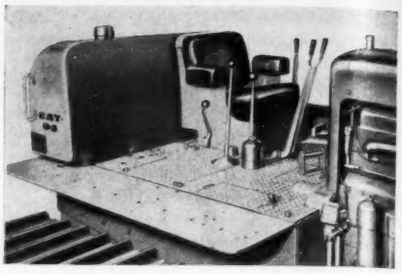
FABREEKA PRODUCTS COMPANY, INC.

222-U Summer Street, Boston 10, Massachusetts

NEW YORK • CHICAGO • DETROIT • SPARTANBURG • PHILADELPHIA • PITTSBURGH • OAKLAND

Crawler Tractor Offered in New Models With Torque Converter or Direct Drive





Easily accessible controls, a smooth deck, and a higher seat make the new D8 tractor easier to operate and more powerful.

■ A new and more efficient successor to the Model D8 crawler tractor has been introduced by Caterpillar Tractor Co., Peoria 8, Ill. Improvements on the new D8 are reported to make it more powerful, faster, easier to operate, and easier to service than the widely known model it succeeds.

A specially designed engine gives this model 191 horsepower at 1,200 rpm compared to 185 at 1,200 rpm in the previous unit. The drawbar horsepower is now 155. The more powerful D8 is being offered in two models, one with a torque converter (Series D) and one with a direct drive (Series E).

Matching attachments for the new D8 include the rear-mounted double-drum No. 29 cable control and the front single-drum No. 30 cable control. Larger bulldozers with six-part lines have also been designed for this tractor. In addition, all of the equipment for the older D8 is adaptable for use with the Series D and Series E units.

With a three-stage 5:1 torque converter, the D8 Series D has speeds up to 7.4 mph, three forward and three reverse. The direct drive gives five forward speeds and three in reverse, ranging up to 5.2 mph with the standard transmission, and 7.2 with an optional transmission. The D8 Series D offers over 50,000 pounds of drawbar pull.

An important feature of the new engine of the D8 is a "live shaft" drive, independent of the flywheel clutch. This provides constant power for the rear-mounted cable controls and the steering-clutch booster pump drive.

Other engine features are a new fuel-injection system with capsule-type injection valves, flanged-center main bearing to take crankshaft thrust, and timing gear integral with the crankshaft.

Much attention has been given to operating ease. Controls and the driver's seat have been relocated for convenience, and the driver can now start the tractor from his seat. The seat is on the left-hand portion of a smooth uncluttered platform.

The steering clutch case construction, consisting of steel plate and steel castings welded into one unit, forms a strong backbone for the entire machine. The new D8 tractor features a seven-roller track frame, longer-wearing shoes, and longer tracks providing 4,917 square inches of ground contact.

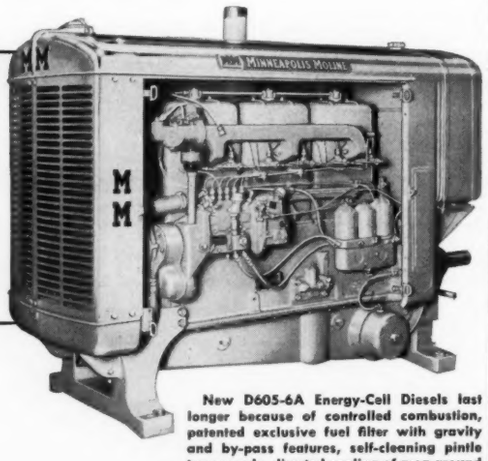
The over-all length of the Series D is 17 feet 1½ inches, while the Series E is 16 feet 3 inches long. Both models are 7 feet 5⅛ inches high and 8 feet 7¾ inches wide. The Series D unit weighs 41,265 pounds, and the Series E, 40,430 pounds.

For further information write to the company, or use the Request Card that is bound in at page 18. Circle No. 835.

WHY IT PAYS TO OWN INDUSTRIAL DIESELS WITH REMOVABLE CYLINDER BLOCKS AND HEADS

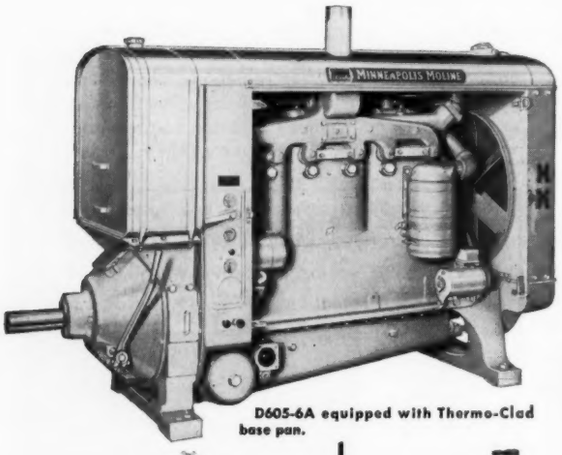
New MM diesels were developed with *energy-cells* to make them last longer, do more and go farther with less down-time and maintenance.

To provide owners with lower cost maintenance when necessary MM diesels are the most advanced and soundly engineered because the cylinder blocks are cast in pairs separate from the crankcase.



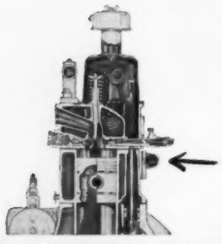
New D605-6A Energy-Cell Diesels last longer because of controlled combustion, patented exclusive fuel filter with gravity and by-pass features, self-cleaning pintle type nozzle, directed cooling of area around combustion chambers.

YOU GET THESE ADDED ADVANTAGES . . .

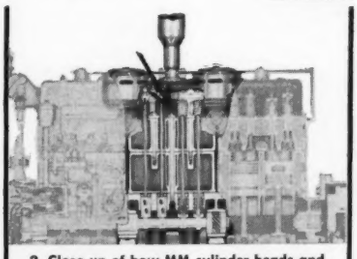


D605-6A equipped with Thermo-Clad base pan.

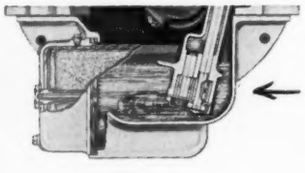
1. Ease of maintenance and low cost emergency service because paired cylinder blocks, pistons, and rods can be removed as a unit by one man.
2. Prolonged time between overhauls by use of close-grain cast iron that provides best cylinder lubrication for reduced wear.
3. Less service due to minimum distortion as MM cylinder heads, cylinder blocks and crankcase are virtually strapped together by full-length steel studs anchored in the main bearing bulkheads. (Transmits combustion pressure to heavy crankcase that has extra depth below center line of crankshaft.)
4. Efficient operation obtained by uniform cylinder expansion . . . the result of controlled cooling and long oil-cooled cylinder wall skirts below ring travel area.
5. "New engine" performance at extremely nominal cost can be obtained right in the field without special tools using factory matched cylinder blocks, pistons, pins, and rings. (Blocks are dowelled to crankcase to assure bore is square with crankshaft and pistons are precision fit to bore . . . equivalent to a factory job.)
6. Lower initial cost stems from high production parts by casting cylinder blocks in pairs separate from the crankcase.



1. Cylinder head and block assembly shows coolant entrance at hottest point first and extra long skirt wall construction.



2. Close-up of how MM cylinder heads and blocks and crankcase are tied into a single rigid unit with long studs.



3. A D283 feature is extra large oil filter enclosed in base pan, floating-screen oil pump intake, and pump located in bottom of base pan.

Optional Thermo-clad water-blanketed base pans for all units also have oil filter included to give more effective filtering.

INDUSTRIAL MM MODERN MACHINERY DIVISION

MINNEAPOLIS-MOLINE

MINNEAPOLIS 1, MINNESOTA

DRILLING CONTRACTORS

Diamond and Shot Core Borings, Dry Sample Borings, Grout Holes and Pressure Grouting, Foundation Testing for Bridges, Dams and all Heavy Structures

Leading manufacturers, also, of High-Speed Diamond Drilling Machines and Complete Accessory Equipment, including all types of Diamond Drilling Bits.

Write for Catalog No. 320

SPRAGUE & HENWOOD, INC.

Dept. C, Scranton 2, Pa.

New Concrete Vibrator

■ A versatile 6-hp gasoline-powered concrete vibrator that can be adapted to do many jobs has been placed on the market by Mall Tool Co., 7725 S. Chicago Ave., Chicago 19, Ill. The Model 14GV23 vibrator is furnished with either a Wisconsin or Briggs & Stratton engine. It has a one-cylinder, four-cycle motor that runs at a moderate 3,600 rpm.

A two-step pulley for regulating speed comes in two types, one with a 1,200 to 7,000-rpm speed range and the other with an 1,800 to 10,000-rpm range. The manufacturer points out that this system puts the right vibrating frequencies at the vibrating head while allowing the engine itself to operate at the lower speed.

The new Mall vibrator is easily adapted to dry concrete grinding, wet-rubbing concrete, and grinding welds. Replacing the spindle with a sump pump converts the vibrator into a pump that will handle 4,500 gallons per hour against a 25-foot head.

For further information write to the company, or use the Request Card at page 18. Circle No. 839.

The versatile new Mall Model 14GV23 concrete vibrator is easily adapted to dry concrete grinding, wet-rubbing concrete and grinding welds. It even converts to sump-pump use.

Hammer-Knife Mowers Can Work Over Debris

■ The Mott hammer-knife mowers that mount on 3-point hitch tractors are illustrated in a folder available on request. Driven from the tractor power takeoff, the mowers shred weeds, stalks, and stubble, and chop light brush. A feature of the mowers is that they can work in rock or rubbish without damage to the loosely hung hammer-knives.

The hammer-knives do not shear as does the reel-type or sickel-bar type of mower. Attached to a steel shaft turning at 2,000 rpm, the knives stand straight out with their tips traveling at more than 70 mph. In rocks and trash, the loosely hung knives fold back out of the way and return to cutting position automatically when in the clear.

The folder shows 4 and 6-foot models.

To obtain this literature write to C. W. Mott, 4015 Eberly Ave., Brookfield, Ill., or use the Request Card at page 18. Circle No. 829.

Leaflet on Membranes For Concrete Curing

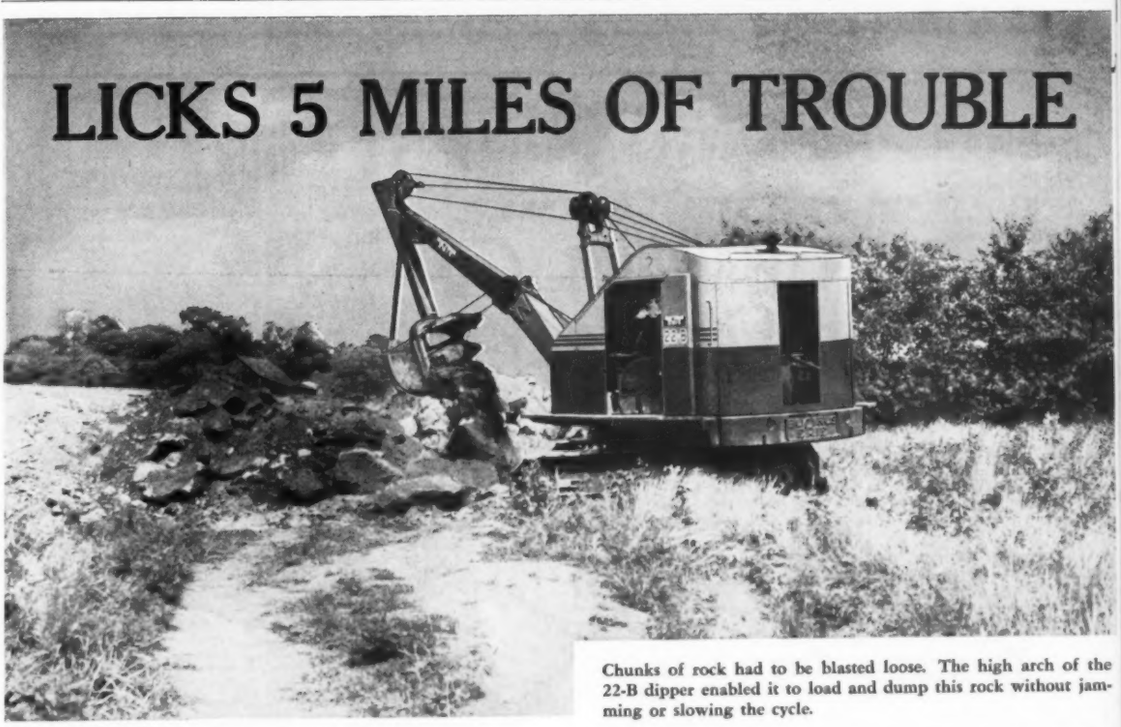
■ A leaflet available on request describes Konkure concrete-curing membranes available in clear, white, gray, and black-pigmented types. Spraying equipment for applying the curing compounds, including a hand-spray outfit and a power-driven unit, is also shown.

Konkure clear is recommended for curing concrete where the natural surface color and finish is to be retained. A deep orange dye added for visibility during application fades out completely upon drying, leaving the concrete in its natural color and finish.

The leaflet also describes Konkure P.C.C., a compound designed to cure precast tilt-up concrete construction where surfaces are to be painted after the slabs have been in place for 30 days or more.

To obtain this literature write to Konkure Co., 6742 Stanton Ave., Buena Park, Calif., or use the Request Card at page 18. Circle No. 898.

LICKS 5 MILES OF TROUBLE



Chunks of rock had to be blasted loose. The high arch of the 22-B dipper enabled it to load and dump this rock without jamming or slowing the cycle.

ON DELAWARE SEWER TRENCHING JOB

When the James Julian Construction Company contracted to dig five miles of sewer trench along state highway 141 near Wilmington, Delaware, Superintendent J. H. Hubbard figured he had trouble on his hands — and he did. The material turned out to be 40 per cent solid rock and 60 per cent hardpan clay. It had to be trenched 9 ft. deep for 30-in. mains and 12-in. secondary lines.

Superintendent Hubbard summed up his experience with the 22-B's by remarking, "I didn't quite appreciate how tough these 22-B machines were until we started this job. In digging like this you soon learn to respect a machine for its ability."

There's a reason why there are more Bucyrus-Eries working in rock than any other machines. They have the extra stamina for rough going, as well as the extra production ability for any job. Let your Bucyrus-Erie distributor show you why.

95E55C

Front-to-rear taper of dipper speeds dumping, means extra clearance in wide trench work.

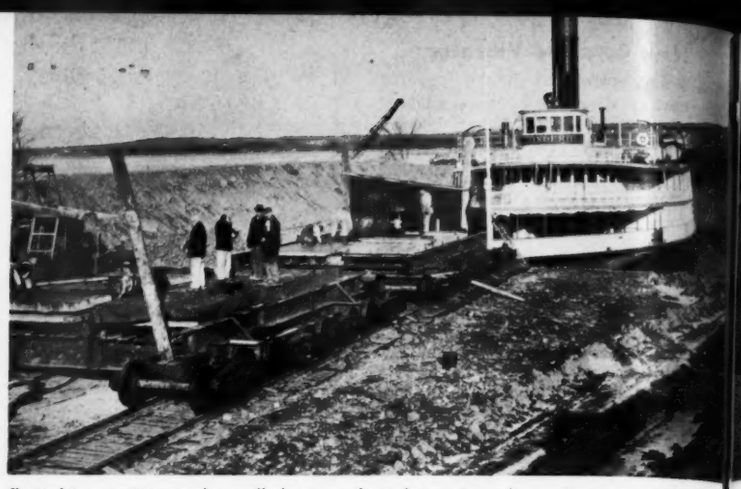
The box section boom and dipper handle eliminate dead weight, yet are plenty strong for tough digging. The entire front end can be positioned below cab height for safe, easy clearance in traveling.

BUCYRUS ERIE

South Milwaukee, Wisconsin

CONSTRUCTION CAMERA

A last voyage for the S. S. Ticonderoga—a 220-foot Lake Champlain sidewheeler—begins as a Lima crane works on the rail-mounted cradle which will carry the ship two miles overland to the Shelburne Museum near Burlington, Vt. The ship waits in a 7-foot-deep basin which will be flooded until the Ticonderoga can be floated into position on the cradle by crews from the marine salvage department of Merritt-Chapman & Scott Corp., New York, N. Y. As the rail-mounted sidewheeler is pulled along by truck and winch, crews will pick up the track and re-lay it in front of the ship until the portage is completed.



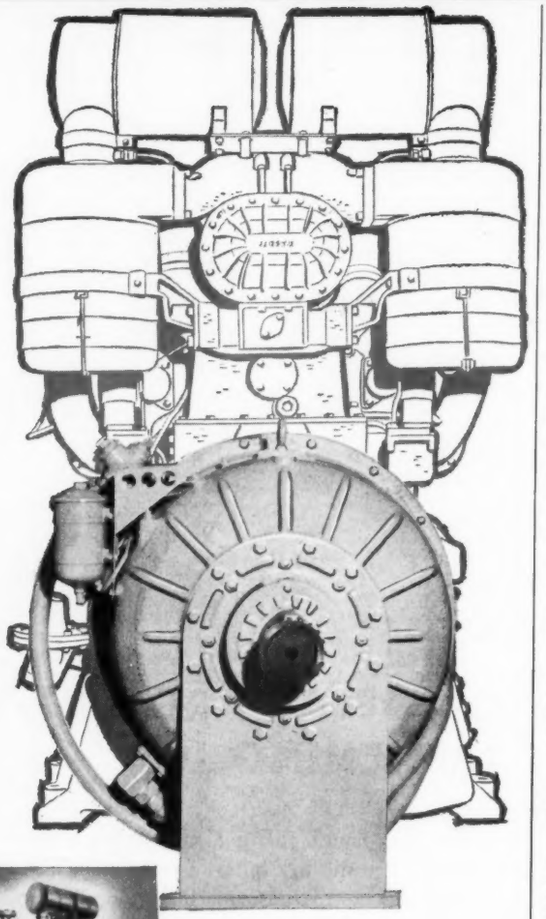
more flexibility
more wear life
more work

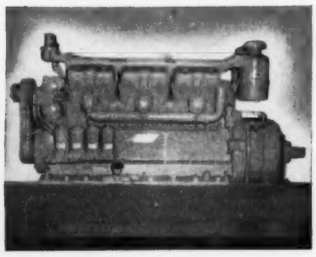
from new

CATERPILLAR

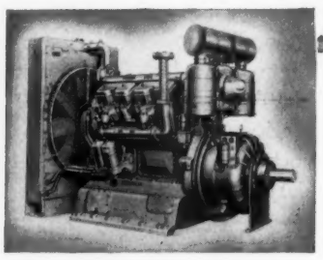
Torque Converter

Power Units . . .





Caterpillar Torque Converter Power Unit — a Model D386 Cat Diesel working through Twin Disc Model CF Torque Converter.



Cat D375 Torque Converter Power Unit. Twin Disc Torque Converters are standard equipment.

Twelve different torque converter arrangements are available for six Caterpillar Diesels, up to 493 hp. Twin Disc also provides a wide choice of output shafts, for both in-line and side loads.

FOR THE FIRST TIME, you can order any one of 6 Cat Diesel Engines *Torque Converter-equipped at the factory* . . . as complete Torque Converter Power Units, developed through design teamwork by Twin Disc and Caterpillar engineers.

The result is *tremendous* performance—for power source and power linkage are *ideally* matched.

To give you a quick idea of how much Torque Converters mean to modern diesel power, here are a few facts you'll want to remember: on the new Cat Power Units, the Twin Disc Torque Converters • *match torque output automatically to the load* • *start loads smoothly* • *provide control of load movement without using clutch* • *prevent overloads from killing engine* • *permit hovering or holding under power* • *keep engines operating in maximum efficiency range at all times.*

Whether you're thinking about a new power unit or planning to replace a present one, find out how much *more* flexibility, *more* wear life, and *more work* you'll get *through Twin Disc Torque Converter Drive.* Contact your engine dealer . . . he'll give you the facts and figures.

In the meantime, if you want more details on other Industrial-Type Torque Converters, write Twin Disc, Hydraulic Division, Rockford, Ill., and ask for Bulletin 135-D. TWIN DISC CLUTCH COMPANY, Racine, Wisconsin; Hydraulic Division, Rockford, Illinois.

TWIN DISC

TWIN DISC

Torque Converters

HRB Publication Treats Stabilization of Soils

Three papers on soil stabilization are contained in the latest bulletin issued by the Highway Research Board. The first, "Effect of Petrographic Variations of Southwestern Iowa Loess on Stabilization with Portland Cement", relates the effect of particle size and shape, mineralogical composition, and clay-silt relationships to the stabilization process using portland cement.

The effects of calcium chloride under different moisture conditions, is covered in "Stabilization of Bank-Run Gravel by Calcium Chloride". The last paper, "Strength of Soil-Cement as a Function of Degree of Mixing" describes a laboratory investigation of variables involved in mixing portland cement into a clayey silt. It covers such variables as soil and cement mixture, compressive strength of soil cement, mixing time, and accumulative energy required for mixing.

Copies of Bulletin 98, "Stabilization of Soils", may be ordered at 75 cents each from the Highway Research Board, 2101 Constitution Ave., Washington 25, D. C.

Load Tests on Piles Treated in ASTM Books

The behavior of piles under different types of loading and in many kinds of soil conditions is described in "Symposium on Lateral Load Tests on Piles" and its supplement. Both booklets are published by the Amer-

ROAD BUILDERS — IT'S SENSATIONAL

DRAGS **PECKERWOOD** DRAGS

STEEL SPRING WIRE ROAD BROOMS

MADE IN ANY C-O-N-T-I-N-U-O-U-S LENGTH UP TO 12 FEET
WIDTH 6 INCHES—IT'S 3 DIFFERENT
ASSEMBLE YOUR OWN—IN ANY SHAPE REQUIRED—IN MINUTES, NOT HOURS

NO FRAME REQUIRED

MADE WITH KILN DRIED 6" WIDE HARDWOOD AND HEAVY SPRING STEEL WIRES TRIPLE OUT EACH HOLE. NOT STAPLE SET.

THIS IS IT ORDER NOW

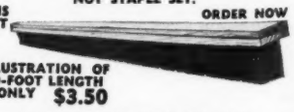


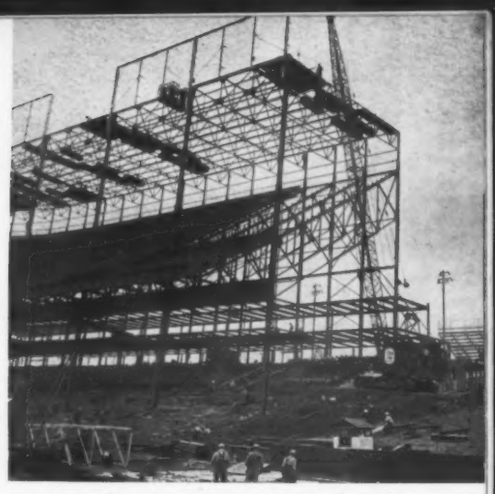
ILLUSTRATION OF 10-FOOT LENGTH ONLY **$3.50**

RUNNING FOOT F.O.B. KC., MO.
NOTICE! Our 15" length Unit Drag 3" wide with the two bolts that fit your frame, still $2.50 ea.

SINCE **VAN BRUSH MFG. CO.** 1928
327 S. WEST BLVD., KANSAS CITY 8, MO.

Miter-type lock gates, fabricated by American Locomotive Co's Schenectady, N. Y., shops, are fitted into place on Lock 17 of the New York State Barge Canal by P&H cranes.

Working from a barge in cramped quarters, a Bucyrus-Erie 22-B crane handles forms and steel reinforcing during substructure work on the Tappan Zee Bridge which will carry the New York Thruway across the Hudson.



Completing the new stadium at Kansas City, Mo., in time for the opening of the baseball season, a Koehring 605 crane with 110-foot boom and 25-foot jib lifts creosoted planks to the roof for sheathing.

ican Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

"Symposium on Lateral Load Tests on Piles" includes eight papers, covering tests of full-sized piles and laboratory tests on model piles, which were presented at the 56th annual meeting of the ASTM. Two papers in the supplement were presented at the 57th annual meeting. The booklets, designed to aid engineers concerned with the design of dams, waterfront structures, and buildings resting on pile foundations, may be ordered from the society for $2.75. Because the original symposium has had a substantial distribution, copies of the supplement may be obtained separately at $1.50 each.

Blast Cleaning Machines

■ A line of abrasive-blast cleaning machines with hand-operated nozzles is shown in literature from Pangborn Corp., Hagerstown, Md. This concern manufactures a series of such machines designed for various degrees of service.

They feature a tank designed to hold the abrasive (usually under pressure), a mixing chamber in which air and abrasive are combined, and simple air-control methods.

Included in this series are direct-pressure and suction machines, wet abrasive machines, and many portable models.

To obtain Bulletin 100B write to the company, or use the Request Card at page 18. Circle No. 916.

TRANSITS AND LEVELS

You will find the best bargains at Warren-Knight. New or rebuilt—for sale or for rent—We will buy or trade your used transits, levels, alidades, etc. Send your instruments for valuation.

Write for free catalog EC-55 of instruments, field equipment and drafting room supplies.

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136 NORTH 12TH STREET PHILADELPHIA, PA.

LORAIN MC-425

NEW 25 TON MOTO-CRANE®

ANOTHER LEADER FROM THE LEADER

2 CARRIER WIDTHS

Now a 25-ton Moto-Crane with an overall width of only 96". Legal width in most states for over-the-road travel. Also available as Model MC-425W in 108" overall width for greater lifting capacities-on-rubber over the sides.

HIGHER CAPACITY TUBULAR BOOM

Square tubular chords and continuous tubular lacing increase strength and capacities yet reduce total weight in this quickly assembled, pin-connected boom. Plenty of capacity to travel with long booms over rear.

TILTING MAST GANTRY*

For easiest handling of long booms . . . tilts up or down as boom is raised or lowered to provide most efficient angle for boom hoist cable *at all times.* Standard 8-part boom hoist derricking gives slower, more precise boom control.

REMOVABLE COUNTERWEIGHT

Turntable and Carrier prepared for quick, easy counterweight removal. Reduces vehicle total weight for highway travel.

3-POSITION MOUNTING

Turntable mounting position can be selected to best fit the job and front end being used: (1) for proper clearances for shovel-hoe-dragline; (2) for general-purpose crane-clam application; (3) for 20 tons crane lifting capacity over rear on rubber.

DUAL REMOTE CONTROL*

Permits full air control from turntable cab of carrier engine throttle and clutch, carrier steering and air brakes, carrier travel at 1 speed forward or reverse. Quick, easy changeover from long range Moto-Crane travel to operator-controlled on-the-job localized travel.

*Extra Equipment

THE THEW SHOVEL CO., LORAIN, OHIO

It took a lot of rubber-tire crane "know-how" to build the MC-425 and MC-425W . . . to develop such big capacities at minimum weight and width . . . to provide so many operating and profit-making features . . . and Thew-Lorain alone has the vast experience that makes such advantages possible, due to the more than 35 years of rubber-tire experience they have acquired since originating the truck crane in 1918 . . . the leader still leads! The MC-425 and 425W are your proof.

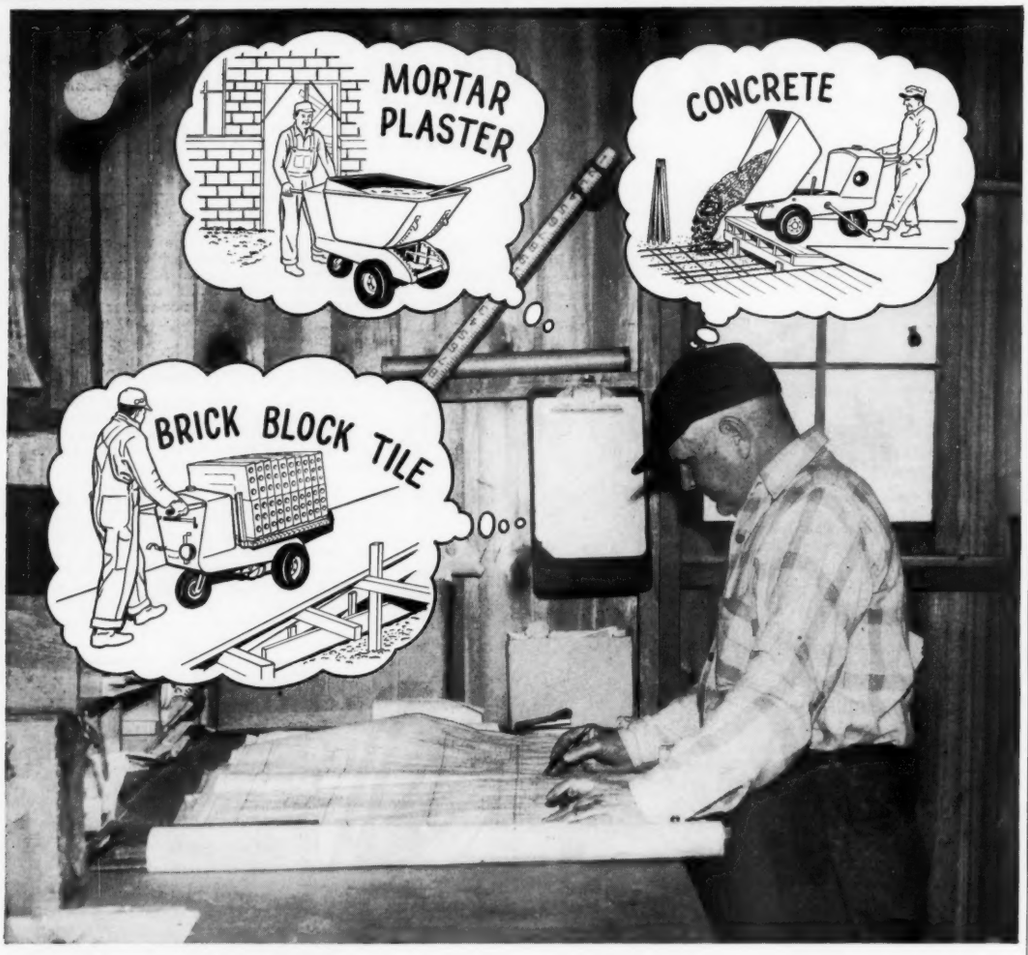
SEE YOUR NEAREST THEW-LORAIN DISTRIBUTOR FOR THE NEWEST FACTS ON THE NEWEST LORAIN.

THEW LORAIN

CONSTRUCTION CAMERA

Doubled capacity for traffic on U. S. 20 near Erie, Pa., will be a reality when the two-lane road is converted into a four-lane divided highway. Fred W. Ewig, Inc., Corry, Pa., has a Gar Wood Buckeye Hi-Way widener make two parallel cuts along one side of the existing pavement is preparation for the widening.

A Kentucky Turnpike bridge across the Salt River at Sheperdsville, Ky., begins to take shape as a Lorain Moto-Crane with 70-foot boom uses a Vulcan No. 1 power hammer to drive 14-inch H-beam steel piling for the structure. The 500-foot span is being built under a $600,000 contract by W. M. Hooper, Caneyville, Ky.



This man will handle his materials . . . Faster . . . Easier

with power equipment that can be used throughout the job!

Contractors use PRIME-MOVER when there is **concrete to place — brick to haul — materials to move.** PRIME-MOVER is an everyday tool . . . a tool that helps the contractor to bid lower — build faster — make money. PRIME-MOVER is sold and serviced by reliable distributors throughout the U. S. and Canada. The coupon is for your convenience. Use it now.

PRIME-MOVER

THE PRIME-MOVER CO., MUSCATINE, IOWA

THE PRIME-MOVER CO., Muscatine, Iowa

Gentlemen: Please send me On-the-Job Reports of Prime-Mover in construction work. Also specification data.

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Publish New Edition Of ASTM Standards

The new edition of "ASTM standards on Mineral Aggregates, Concrete, and Nonbituminous Highway Materials" has been published by the American Society for Testing Materials. Included in the book are standard and tentative specifications, test methods, and definitions pertaining to mineral aggregates, concrete, and nonbituminous highway materials.

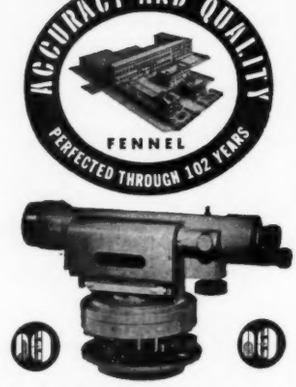
Subjects covered by the volume include specifications and methods of test for aggregates, ready-mix concrete; air-entraining admixtures, and methods of test for air content of concrete. Other sections of the book deal with compressive and flexural strength, freezing and thawing, slump test, brick and block pavement materials, concrete-curing material, expansion joint fillers, and cement. Altogether, 103 ASTM designations are included in the 352-page book.

Copies may be ordered at $3.50 each from the American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

Surveying experts favor

FENNEL INSTRUMENTS

ACCURACY AND QUALITY — PERFECTED THROUGH 102 YEARS

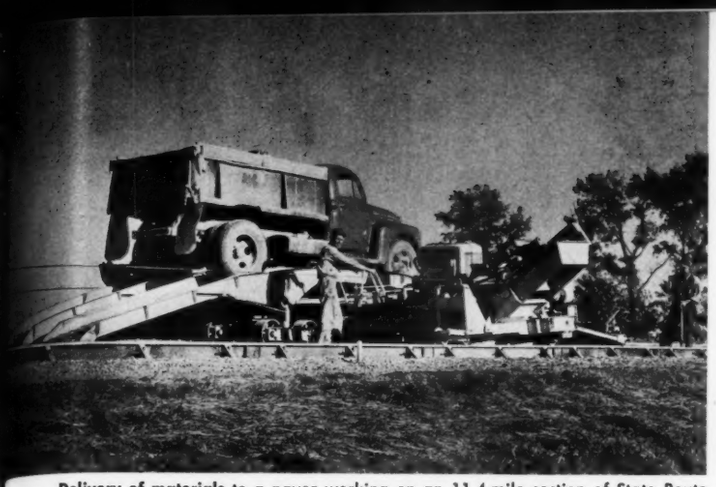


"NITAC" — World's only level with split bubble, erect image. One of many super-fine levels, transits, theodolites, made by Fennel's old-world craftsmen. Performance-proved in 58 countries. Send for particulars, prices.

FENNEL INSTRUMENT CORP. OF AMERICA

11-27 44th Rd., Long Island City, N. Y.

Dealers in principal cities



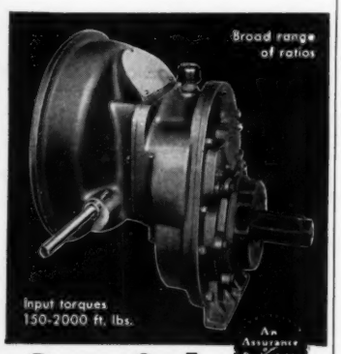
Delivery of materials to a paver working on an 11.4-mile section of State Route 44 near Drayton, N. Dak., is made simple for this batch truck. Here the truck uses a Blaw-Knox cross-over bridge to bypass a B-K subgrader on the paving contract being handled by Schultz & Lindsay Construction Co., Fargo, N. Dak.

Breaking ground for a 60,000-square-foot addition to the new Clark Equipment Co. plant at Benton Harbor, Mich., is appropriate work for Clark machinery. A Michigan C-24 crawler hoe excavates to permit tile to be set, while a Michigan 175-A tractor shovel backfills.

Courses for Pennsylvania Maintenance Men

A series of training courses for county maintenance forces, designed to increase efficiency in administration, maintenance and force account work, safety procedures, clerical work, equipment operation, and material control, has been initiated by the Pennsylvania Department of Highways.

Officials expect the meetings, held at district level, to improve the relationship between the public and highway personnel, as well to provide personnel with a good groundwork in state highway programs and procedures. Other meetings and the extension of the program into each county is planned should the current program result in improved service to taxpayers and increased efficiency within the department, The courses, conducted by district engineers, are being held for county superintendents, assistant superintendents, garage foremen, and chief clerks now working in the State's maintenance department.



Special heavy-duty

- **Transmissions**
- **Reduction Units**
- **Mechanical Drives for Torque Converters**

Cotta Transmission Co., Rockford, Illinois

COTTA HEAVY-DUTY TRANSMISSIONS

"Engineered-to-order"

BLAW-KNOX ROAD WIDENER SPREADS 500 TONS PER DAY ON PENNSYLVANIA WIDENING JOB

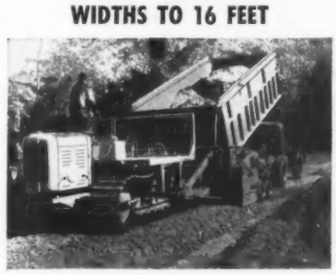
This job really rolled for D. E. Smith, Inc., of Mifflin, Pa. Their contract called for widening ¾ths of the stretch from 18′ to 22′ and the balance from 20′ to 24′... spreading 2″ of fines in the bottom of a 3-foot wide trench and, after compaction, spreading 10″ of No. 4 crushed stone on top of the fines.

The Blaw-Knox Model 95 Road Widener sewed up this job at a schedule trimming clip... spreading 500 tons per day, or widening approximately 3200′ of highway every 10 hours!

Speedy operation is just one way Blaw-Knox Road Wideners step up profits. They also lay concrete without forms, handle asphaltic concrete, dirt, gravel, stone or any kind of aggregate. They handle any widening jobs from 2′ to 10′ widths. Your Blaw-Knox distributor will gladly show you the time-saving, money-making features of the Model 95 Widener. Call him today.

BLAW-KNOX COMPANY
Construction Equipment Division
Pittsburgh 38, Pa.
Offices in Principal Cities

BLAW-KNOX BASE PAVERS LAY 400 TONS PER HOUR DEPTHS TO 20 INCHES WIDTHS TO 16 FEET



Two models available to cut weeks off base course schedule time! Blaw-Knox Base Pavers spread stone, slag, gravel, soil cement or crusher run aggregate *without segregation.* Straightedge leveling reduces the need for hand dressing behind the unit for accurate results.

BLAW-KNOX

BLAW-KNOX also manufactures a "Complete Package" of concrete paving equipment

Clamshell Buckets

Batching Plants

MultiFoote Pavers | Spreaders and Finishers | Road Forms

CONSTRUCTION CAMERA

Fill compaction for the $600,000 Elmer J. Chesbro Dam on Llagas Creek in California's Santa Clara County is achieved by sheepsfoot roller and Southwest compactor pulled by Caterpillar D8 tractors. The substructure, 975 feet long and 95 feet high from bedrock, will control flood waters in the valley.

For breakwater repair on Capras Island, Guam, a Euclid with twin engines—each driving a separate rear axle—hauls coral rocks weighing up to 60 tons each. The 130-foot-deep sea wall, to protect the island shore from Pacific storms, rises 25 feet above water and is 50 to 60 feet wide at the top. *Official U. S. Navy Photo*

Airfield Specialist Joins Asphalt Institute Staff

A new addition to the field engineering staff of The Asphalt Institute, College Park, Md., is Lyle E. Martin, who will serve as district engineer in Division 1. He will work from headquarters in New York City with Herbert Spencer, division engineer.

A specialist in materials and asphalt engineering, Mr. Martin has worked on surface design and construction of military air fields in Alaska, Greenland, French Morocco, and South America. Most recently, he was division civil engineer in the construction and maintenance of Air Force bases at Sondre Stromfjord and Thule, Greenland.

He has been construction engineer on a new Air Force base at Ben Guerir, French Morocco and airways engineer at Anchorage, Alaska in charge of paving with the Civil Aeronautics Administration. Mr. Martin served as supervising paving engineer in Trinidad, B.W.I., before returning to the U. S. as materials engineer during the construction of the Pratt and Whitney airport in Hartford, Conn., and Idlewild Airport in New York City.

Twin Coach Co. Purchases Stock of Davey Compressor

Twin Coach Co., Kent, Ohio, will purchase all the outstanding stock of Davey Compressor Co., Kent, Ohio under terms of an agreement made between the two companies.

The Davey company will continue to operate under its present management as a subsidiary of the Twin Coach organization. Established in 1929, the Davey Compressor Co. manufactures portable and industrial air compressors, truck power takeoffs, pneumatic tools, and rotary drill rigs. The Twin Coach Co., organized in 1927, produces Fageol gasoline and propane engines, diesel engines, and specialized automotive vehicles.

Cummins Names Williams Manager of Distribution

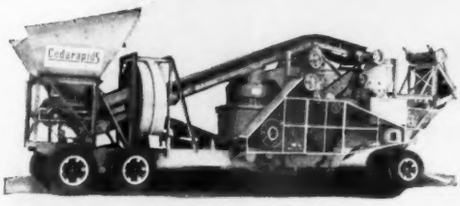
The Rocky Mountain regional manager for Cummins Engine Co., Inc., Columbus, Ind., L. E. Williams, has been promoted to the position of manager of distribution.

He succeeds Paul J. Every, now assistant general sales manager.

PUT Cedarapids Built by IOWA IN YOUR FUTURE!!

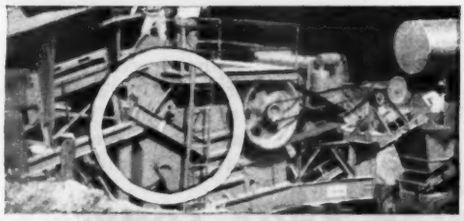
FOR BIG-PROFIT AGGREGATE PRODUCTION . . .

PORTABLE DOUBLE IMPELLER IMPACT BREAKERS, used for primary reduction, give high tonnage output of cubical aggregate. The high ratio of reduction (40 or 50 to 1), added to simple design and low maintenance, assures big-volume production of low-cost crushed rock and gravel.



***NEW* CONE CRUSHER SECONDARY** combines the great mobility of Cedarapids portable design with the high capacity and low-cost operation of Symons® Cone Crushers. The result is big-volume finished crushing of even the hardest or most abrasive rock or gravel to uniform, finely crushed aggregate. SYMONS . . . a registered Nordberg Trademark

COMMANDER PLANT, now built with a big, new Cedarapids 30" Roll Crusher to step up secondary crushing capacity by 12%, out *even greater* tonnages of finer-sized aggregate than be . . . *and at the same cost per ton!* The design ratio of the Jaw Crusher, the new 3025 Roll Crusher, the big 48"x10' Horiz Vibrating Screen, and the 30" wide Conveyors is the secret o Commander's high capacity.



PORTABLE PRIMARY with Vibrating Grizzly, which by-passes most of the undersize material and fines, increases primary output up to 25%, and greatly decreases jaw crusher wear per ton of production. Vibrating Grizzlies step up production in any pit or quarry, but are particularly effective wherever the percentage of fines is high.

GET COMPLETE DETAILS FROM YOUR CEDARAPIDS DISTRIBUTOR

The Cedarapids Line of Equipment Includes:

PORTABLE AND STATIONARY CRUSHING, SCREENING AND WASHING PLANTS FOR STONE GRAVEL AND SAND • BELT CONVEYORS • VIBRATOR AND REVOLVING SCREENS • FEEDER • HAMMERMILLS • DOUBLE IMPELLER IMPACT BREAKERS • BATCH TYPE AND CONTINUOU FLOW TYPE BITUMINOUS MIXING PLANTS • DRIERS • DUST COLLECTORS • VIBRATIN SOIL COMPACTION UNITS • MOTORIZED HEAD PULLEYS

Built by Iowa . . . Sold the World Over

A clear road for traffic is maintained by a Pettibone Mulliken Speedall using a dozer blade to push material off U. S. 71 as it backfills a water-main trench at Kansas City, Mo. As the backhoe excavates the trench and places short lengths of pipe, the Speedall moves in to complete the job.

One of five International 2T-55 high-speed earthmovers working on the 10,000-acre U. S. Army Corps of Engineers ammunition loading dump near Wilmington, N. C., gets a push load from an International TD-24 crawler. The moving of 1,300,000 cubic yards of earth is included in the $23 million project.

Assure your share of the coming highway boom!

In the Cedarapids line of aggregate producing and bituminous mixing plants, *there's a type and size of equipment to meet every specification requirement, every operating condition* for the big job ahead of the Highway Construction Industry.

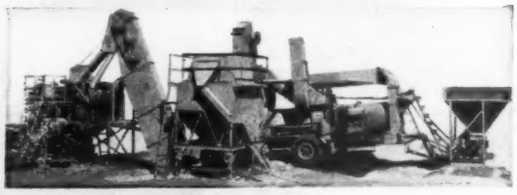
With Cedarapids in your future, you can combine high production with low operating costs for out-sized profits on your share of future contracts!

FOR EVERY BITUMINOUS MIXING JOB

MODEL G60 6000-LB. PLANT is the answer to meeting today's big market demands for asphaltic concrete. The Model G60 produces 3 or more tons at a batch . . . with fully automatic controls, it turns out 180 tons, or more, per hour! Built-in running gear on each sectionalized unit makes transportation easy. Simple, self-contained erection device assures quick set-up.

MODEL G40 4000-LB. PLANT is a new Cedarapids plant designed with every "plus" detail of the bigger G60. Write for a full description of every money-making feature of both sizes.

***NEW* MODEL H15,** a batch-type plant designed for medium sized bituminous paving jobs with capacities ranging from 35 to 60 tons per hour, depending on job specification requirements. This stack-up, tower-type plant is simple to erect, as each section is a self-contained unit.



MODEL CM "COMMERCIAL" MIXER is a money-maker that can't be beat for profitable commercial jobs such as surfacing city streets, driveways, parking lots, playgrounds, tennis courts, etc. This continuous-flow type plant can be used alone to produce cold mix, or with a Cedarapids Drier and Gradation Control Unit for hot mix or high type asphaltic concrete. For bigger jobs, the Cedarapids Master Plant is available.

IOWA

MANUFACTURING COMPANY

Cedar Rapids, Iowa, U.S.A.

IOWA MANUFACTURING COMPANY, Cedar Rapids, Iowa, U. S. A.

Gentlemen: My next job is_____

_____

_____

☐ Please send details of the Cedarapids equipment you recommend.

Name_____

Title_____

Company_____

Address_____

City_____ Zone____ State_____

E. Alfred Picardi Joins Bellman, Gillett & Richards

The architectural and engineering firm of Bellman, Gillett & Richards, Toledo, Ohio, has added E. Alfred Picardi to its staff as an associate and chief structural engineer.

A former structural engineer for the E. B. Badger & Sons Co. and the Morton C. Tuttle Co., both of Boston, Mass., Mr. Picardi was chief structural engineer for Kaighin & Hughes, Inc., Toledo, before joining Bellman, Gillett & Richards.

A graduate of the Massachusetts Institute of Technology and a member of the Toledo Society of Professional Engineers, the American Society of Civil Engineers, and the Engineering Society of Toledo, Mr. Picardi was a member of the Office of Scientific Research and Development attached to the Naval Operations Research Group in Washington, D. C. during World War II.

Owatonna Tool Makes Executive Changes

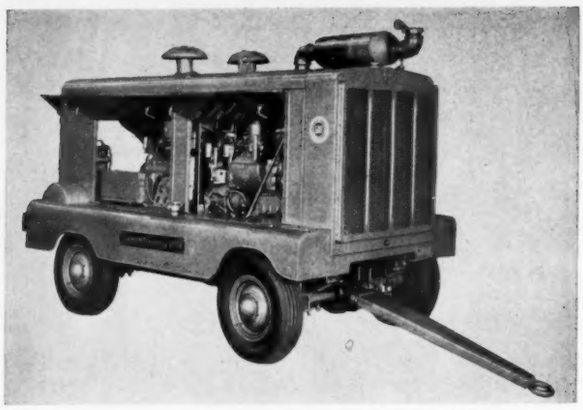
In a series of executive changes at Owatonna Tool Co., Owatonna, Minn., A. R. Kaplan was made president of the firm, manufacturer of maintenance tools and equipment. Formerly vice president of sales and advertising, he succeeds R. A. Kaplan, who became chairman of the board.

R. W. Kaplan, formerly general manager of the Truth Tool Co., Mankato, Minn., has become OTC executive vice president, and D. J. Kaplan, formerly production manager, has become engineering vice president. The former purchasing agent, C. P. Kaplan, has become secretary, and the former secretary, R. R. Bernard, treasurer and comptroller.

Joy Appoints Archibald District Sales Manager

Donald L. Archibald has been made district sales manager in the New England area for Joy Mfg. Co., Pittsburgh, Pa., a producer of air compressors, drills, hoists, and generators.

Mr. Archibald, who joined the Joy company in 1940, will make his headquarters in Boston, Mass. The former manager of the company's Mexico City office, Mr. Archibald was transferred to the St. Louis office in 1951, remaining there until his present appointment.



The Gardner-Denver Rotary 600 compressor.

New Compact Water-Cooled Rotary Air Compressor Designed to Operate in Severe Weather

■ The new Gardner-Denver rotary portable air compressor offers all the basic advantages of compactness, light weight, and simplicity found in rotary compressors. In addition, the Rotary 600 model is water cooled, and is reported to provide reliable operation under severe weather conditions ranging from 40 degrees F below zero to 115 degrees F above. Capacity of the new model is 600 cubic feet per minute. A General Motors Model 6-71 diesel engine powers the unit.

The water-circulating system is fully automatic and constantly maintains efficient temperatures for both the engine and the compressor. An easily operated hydroshift clutch is provided between the engine and compressor so that the compressor load may be disengaged for easier engine starting during cold weather.

The compressor oil system, supplied through a metered oil flow, performs lubricating, sealing, and cooling functions independent of air pressure. A special unit prevents contamination of the oil by moisture condensation and keeps oil from freezing.

The Rotary 600 is equipped with a simple automatic speed control, the Gardner - Denver Thriftmeter. This device is reported to save fuel and wear on the engine and compressor by keeping the operating speed of the unit in line with air demands at any given moment.

Designed to simplify maintenance, the two-stage multivane compressor has two parallel cylinders cast in one block. Inspection covers provide ready access to all vital parts. The Rotary 600, which weighs 8,700 pounds, can turn in a 14-foot radius.

For further information write to Gardner-Denver Co., Quincy, Ill., or use the Request Card at page 18. Circle No. 887.

Details on Stud Welding of Concrete Anchors

■ Details on the stud welding of standard Nelweld stud anchors for concrete are contained in a folder from Nelson Stud Welding Division, Gregory Industries, Inc., 2715 Toledo Ave., Lorain, Ohio. The literature has detail drawings of more than 20 different applications including curbing, column guards, protective platform installations, as well as bridge expansion dams and other structural applications.

Providing information on the standard types and sizes of studs recommended for various purposes, the booklet also illustrates equipment suitable for shop and field use.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 855.

Folder on Bridge Flooring of Formed Steel Plate

■ A folder on Bethlehem formed steel bridge flooring for new and existing highway bridges is available on request. The flooring consists of formed steel plate, which is attached to either steel or wooden bridge stringers to provide a continuous steel base over which bituminous concrete surfacing is applied.

The corrugated plate is 2 feet wide, with trapezoidal corrugations 2 inches deep with not more than a 6-inch pitch. Bethlehem furnishes bridge flooring in 7, 10 and 12-gage steel.

To obtain this literature write to Bethlehem Steel Co., Bethlehem, Pa., or use the Request Card at page 18. Circle No. 808.

VERTICAL PRESTRESSING OF CONCRETE walls for a concrete water tank is done with a Re-Mo-Trol hydraulic jack. Six wires, which are secured in the bottom of the wall, are prestressed at one time.

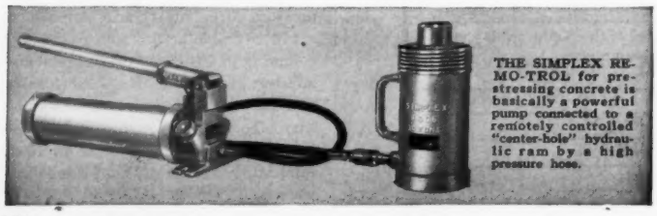
Remote-Controlled Hydraulic Puller Perfected for Prestressing Concrete

Construction Men Cite Simplex Unit for Fast, Easy Use

Tensioning cable, wires or rods for concrete prestressing is being done easily and quickly with Simplex hydraulic "center-hole" pullers, a number of construction men report. Because the unit is actually made up of two parts, a remotely controlled ram and a pump, the puller is more easily handled than conventional hydraulic jacks, they explain. The pump unit can be located nearby where it is most convenient for the operator. Many users install a pressure gauge, available as an accessory, between the pump and the puller to check the amount of prestressing applied. This Simplex Re-Mo-Trol puller is also useful on construction jobs as a powerful jack for lifting equipment and building sections, for aligning heavy beams, etc., and for testing the load bearing ability of the soil. Available in 7 models with capacities from 10 to 100 tons, it works in tight spots and enables workmen to stay at a safe distance while lifting, pulling or pushing.

Made by the world's largest manufacturer of industrial jacks, the Re-Mo-Trol is only one of many Simplex jacks that are useful in the construction industry. Others include the famous Jenny self-contained "center-hole" puller, the No. 310A Emergency Jack which lifts 15 tons on the cap, on the toe, on a cap shoe or at intermediate heights with a chain sling, and standard hydraulic, screw and ratchet lowering jacks. They are all described in General Catalog No. 53. Write for a free copy.

TEMPLETON, KENLY & CO.
2511 Gardner Road • Broadview, Illinois



THE SIMPLEX RE-MO-TROL for prestressing concrete is basically a powerful pump connected to a remotely controlled "center-hole" hydraulic ram by a high pressure hose.

you play it **SAFE** with **Safety-Pulls**

Just as important as the time- and labor-saving advantages of Coffing Safety-Pull Ratchet Lever Hoists is the way each one protects your men from injury . . . your equipment from damage. Here's why:

Load cannot slip even if handle is accidentally released — because of dual Ratchet and Pawl principle, developed by Coffing and an outstanding Coffing advantage for over a quarter of a century.

Load is held positively at all times — there is no friction brake to slip or freeze.

Hooks will not break or straighten out.

"Safety-valve" handle will bend before any other part of hoist gives way.

Safety-Pulls are single-chain tested at 100 percent above warranted, rated capacity.

Find out more about how Coffing Safety-Pulls provide extra protection on the job. Write for Bulletin C5SP.

Coffing Safety Pull Ratchet Lever Hoists
2 coil chain models, ¾ and 1½ tons
10 roller chain models, ¾ to 15 tons

Quik-Lift Electric Hoists
Hoist-Alls • Mighty-Midget Pullers
Spur-Geared Hoists
Differential Chain Hoists
I-Beam Trolleys
Load Binders

Coffing Hoist Division
Duff-Norton Company
Danville, Illinois

The new tower-type Cedarapids mixing plant.

Bituminous Mixing Plant Built for Fast Erection

■ A new batch-type bituminous mixing plant with a capacity range of 35 to 60 tons per hour has been announced by Iowa Mfg. Co., 916 N. 16th St., Cedar Rapids, Iowa. The unit's pugmill mixer has a capacity of 15 cubic feet.

The Model H-15 plant is a tower-type unit consisting of a hot elevator, screen and bin section, batcher and mixer section, bitumen pump, jacketed bitumen piping and valve, stairway, platform, controls, and drives. With the sections designed as self-contained units, the plant is easy to erect.

Both portable and stationary models are available with a choice of combustion-engine or electric-motor drive. All gates and valves are operated manually through mechanical linkage, except the mixer discharge gate which has a manually-controlled hydraulic cylinder.

Portable equipment, mineral filler attachments, and an electric timing and locking device are available optionally. The new plant makes a complete bituminous mixing plant with the addition of a Model 4816-P dryer unit or a 6024 dryer, a dryer feeder unit, and a dust collector.

For further information write to the company, or use the Request Card that is bound in at page 18. Circle No. 848.

Electric Etching Tools Mark Parts and Equipment

■ A line of electric etchers for marking tools and equipment made of iron, steel, or their alloys, is shown in literature from Ideal Industries, Inc., Sycamore, Ill. These tools burn into the metal surface to make a permanent mark, regardless of the hardness.

The Universal model with four etching heats up to 700 watts gives a wide range of marking control. This unit includes a 4-ounce etching tool, a 5-foot cord and plug, and a ground clamp with a 4-foot lead.

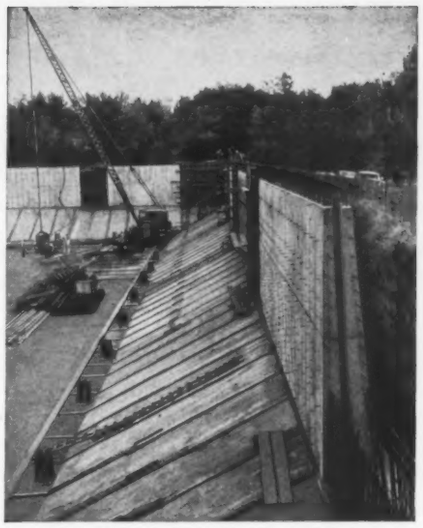
The literature also illustrates a standard model with heats up to 375 watts and a machine-shop model with a maximum rating of 1,300 watts.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 911.

Symons Forms for Battered Walls

Battered walls are constructed similar to vertical walls, the only difference being a variation in the lengths. Ties are placed when inside form is erected . . . outside wall is locked to ties with the same connecting bolts and wedges that bind panels together.

Symons Service includes the details of a forming job from start to finish. Form layouts and job cost sheets are provided upon request without charge or obligation. Attach this advertisement to your letterhead for complete information on Symons Forms and accessories. Symons Clamp & Mfg. Co., 4251 Diversey Avenue, Dept. E-5, Chicago 39, Illinois.

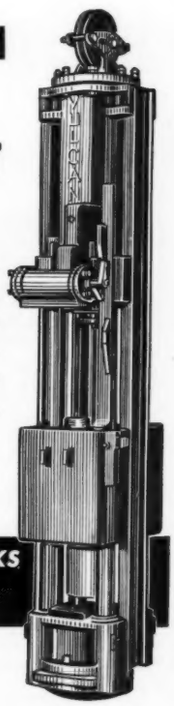


Water Reservoir, Omaha, Nebraska, De Buse Bros., Form Erectors

WARRINGTON-VULCAN

Single-Acting Steam Pile Hammers Deliver Steady-Heavy Blows

Backed by 68 years of outstanding performance, the Warrington-Vulcan delivers a moderate frequency of low velocity blows from a heavy ram. Operates at medium steam pressure. Built-in durability assures continuous, positive action, free of mechanical difficulties.



Write today for complete details and name of nearest dealer...

DEPT. 2

VULCAN IRON WORKS

327 NORTH BELL AVENUE

CHICAGO 12, ILLINOIS

Manufacturers of Pile Driving Hammers and Pile Extractors since 1852

KAPCO

RUBBER ASPHALT JOINT SEALER

Kapco Rubber Asphalt Joint-Sealing Compound, manufactured in Keystone's modern Chicago Heights plant, meets Fed. Spec. SS-S-164 (supersedes Fed. Spec. SS-F-336a), also C.A.A. Spec. P-605, and all State Highway Department Specs. for this type of seal. It comes in 50# strippable bags designed for full protection and ease of handling.

Order separately or in combination with other KAPCO products which include famous Kapco Tongue and Groove Joint, Kapco Fibre or Fibreglas Expansion Joint, Kapco Concrete Curing Compound, etc.

For your own convenience, why not order all of your asphalt road-building materials from one source!

★ BETTER ADHESION!
★ WATERPROOF!
★ EXPANSIBLE TO WITHSTAND BOTH EXTREME HEAT AND COLD!

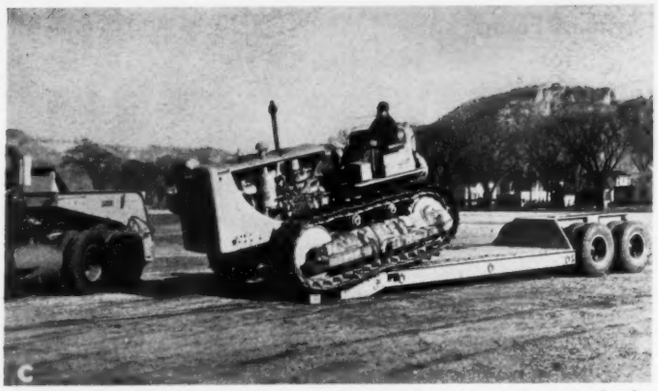
WE GUARANTEE PROMPT SERVICE!

KAP

KEYSTONE ASPHALT PRODUCTS COMPANY

DIVISION OF AMERICAN-MARIETTA COMPANY

General Offices: American-Marietta Building, 101 East Ontario Street, Chicago 11, Illinois



To load and unload this low LaCrosse trailer, the driver turns a lever on the detachable gooseneck. Built-in hydraulic power lowers the platform, and equipment uses a built-in ramp to enter or leave the trailer. A standard fifth wheel and kingpin connect the gooseneck and trailer bed firmly. For details circle No. 924 on card at page 18, or write to LaCrosse Trailer Corp., LaCrosse, Wis.

The self-propelled Road Packer, designed to work on macadam base courses, gravel subbases, and soil-cement bases compacts bases up to 12 inches thick in one course. Six vibrating shoes cover a maximum 13-foot 1-inch width. The machine works equally well forward or reverse. For details circle No. 923 on card at page 18, or write to Roadequip Mfg. Co., R.D. 2, Willoughby, Ohio.

New 42,000 lbs. GVW for real money-making capacity! Ford Tandem Axle T-800 hauls up to 3 tons more payload than other trucks in its class. Optional 11,000-lb. front axle for greater capacity. Power Steering standard. Auxiliary transmissions, full-air brakes available. Short Stroke 170-h.p. V-8.

Something NEW is happening to truck engine design . . .

LOOK UNDER THE HOOD!

THE BIG NEWS in truck engines today is modern short-stroke design. Piston rings last up to 53% longer. You save up to 1 gallon of gas in 7. And only Ford gives you Short Stroke design in every engine—V-8 or Six—in every truck.

Differences between outdated long-stroke engines and Ford's modern Short Stroke design *seem* small, but they're *not.*

In one case, for instance, Ford's stroke is shorter by 1⅔ inches. A small matter? It adds up to 5,121 miles *less piston travel per year*—per piston—for an average year's driving of approximately 26,000 miles.

All this means less friction . . . less wear. The result: lower upkeep costs, longer engine life, greater gas savings, more usable power.

Be sure that your next truck has a modern short-stroke engine. You *will* be sure if it's a Ford Truck! Because Ford *and Ford alone* gives you a Short Stroke engine in *every* model!

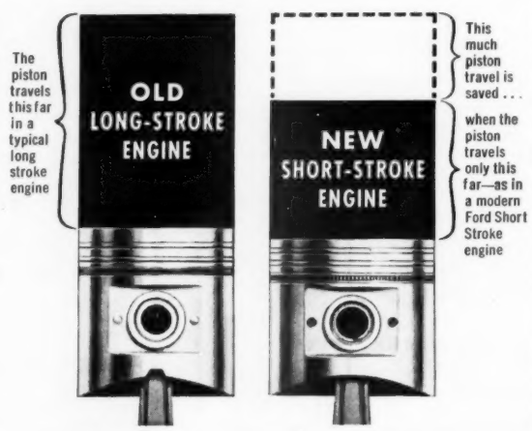

The piston travels this far in a typical long stroke engine
OLD LONG-STROKE ENGINE
NEW SHORT-STROKE ENGINE
This much piston travel is saved . . .
when the piston travels only this far—as in a modern Ford Short Stroke engine

Diagram shows difference in piston travel between typical long-stroke engine and *modern* Ford Short Stroke design. Ford pioneered in Short Stroke design. And only Ford gives you a Short Stroke engine in every truck. That's one reason why Ford was first in sales gains in 1954—the *only* leading make to increase sales!

FORD TRIPLE ECONOMY TRUCKS

THE MONEY MAKERS FOR '55

Booklets on Use and Care Of Portable Saws, Drills, And Electric Hammers

■ Handbooks describing the proper use and care of Black & Decker electric tools are available on request. Three such booklets recently released cover portable electric hammers, saws, and drills.

The booklets include information on motors and current, lubrication and general maintenance, and grounding. They provide details on tool operation and on working ranges.

Sections are devoted to complete listings of attachments for the various tools.

The company's factory repair service is described in some detail. Each booklet has a list of Black & Decker factory sales and service branches located throughout the country.

To obtain these handbooks write to Black & Decker Mfg. Co., Towson 4, Md., or use the Request Card at page 18. Circle No. 810.

Folder on Traffic Paints

■ A line of traffic paints is described in a folder from Verflex Sales Corp., Carlstadt, N. J. The line includes an admix type, Zebra-Glo, and a binder type, Zebra-Stripe. Both are reported to have the desirable qualities of quick drying, resistance to wear, high visibility, and color retention.

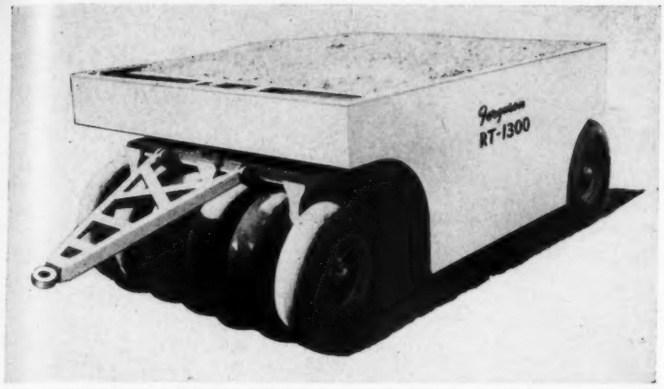
Zebra-Glo paint contains three different sizes of reflective spheres, the large ones providing reflection at first, and the smaller ones maintaining reflectivity as the traffic line wears. Zebra-Stripe is offered in a binder-type paint for drop-on-spheres, in regular, in rubber base, and in a pumice type.

Available colors are white, yellow, orange, red, and black.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 891.

R. B. Murray Jr., Joins Baldwin-Lima-Hamilton

The former Under Secretary of Commerce for Transportation, Robert B. Murray, Jr., has become special assistant to Marvin W. Smith, president of Baldwin-Lima-Hamilton Corp., Lima, Ohio. Mr. Murray, who will work on special projects for B-L-H, will be based in Philadelphia, Pa.



This new Ferguson rubber-tire roller features a heavy one-piece frame, 10-spoke wheels, dustproof bearings, spring-hung oscillating wheels, and strong tongue and hitch. Weighing 10 tons ballasted, the RT-1300 will compact earth fill, sand, gravel, caliche, crushed rock, and asphalt. For details circle No. 925 on card at page 18, or write to Shovel Supply Co., 4900 Hines Blvd., Dallas, Texas.

The mobile Hall-Holmes hydraulic brush-cutting machine can reach out as far as 18 feet and to a height of 19 feet to clear brush from roadside shoulders and slopes. Working at speeds of 1½ to 3 mph, the Model AR-4 travels from job to job at highway speeds. For details circle No. 927 on card at page 18, or write to Four Wheel Drive Auto Co., Clintonville, Wis., sole distributor of the machine.

How Panel Forms Are Used On Sewage-Plant Jobs

■ How Uni-Form panels help reduce concrete-forming costs in sewage-treatment plant construction is explained in a new folder available on request. A set of several engineering drawings accompanying the folder present details on the application of the Uni-Form panel system to this type of construction.

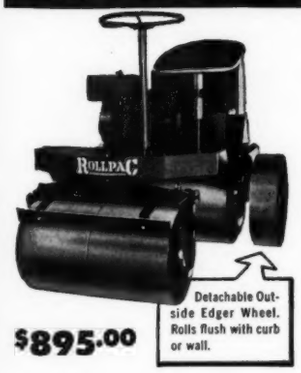
To obtain this descriptive material write to Universal Form Clamp Co., 1238 N. Kostner Ave., Chicago 51, Ill., or use the Request Card at page 18. Circle No. 879.

Field Safety Manual In Pocked-Sized Edition

A compact pocket-sized safety manual designed for the men in the field has been prepared by Allis-Chalmers Mfg. Co., Milwaukee, Wis. Available without charge from the company, the 75-page booklet includes safe practice and data sheets for many standard operations.

The manual can be used as an aid for men who have to fit personnel into new assignments.

SOILAIRE
ROLLPAC
Ruggedly built for heavy-duty service

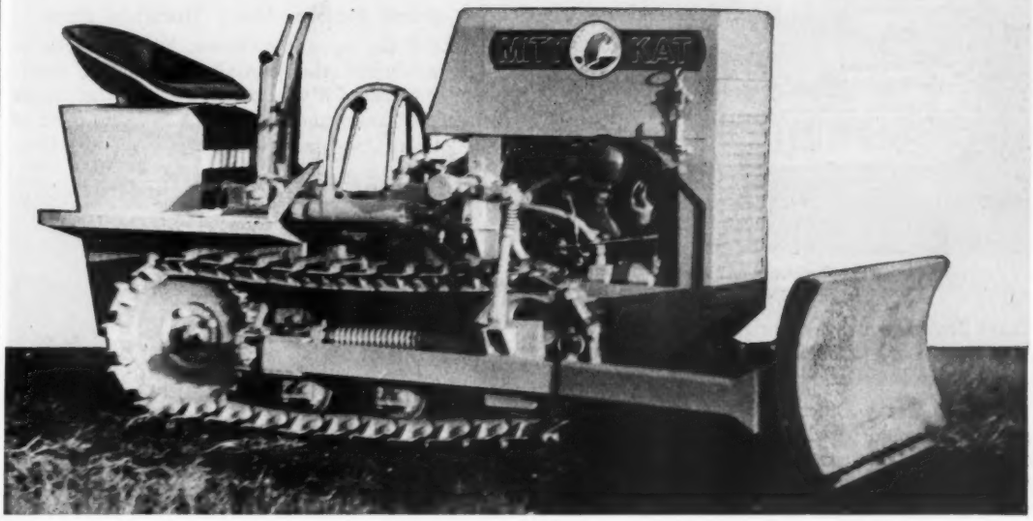


$895.00

A Standout Popular-Priced One Ton Roller. Send for Catalog.

SOILAIRE INDUSTRIES
Minneapolis 3, Minnesota
Sold by over 75 distributors in United States and Canada

Meet the MITY KAT!



New, Powerful, and Easy to Move from Job to Job!

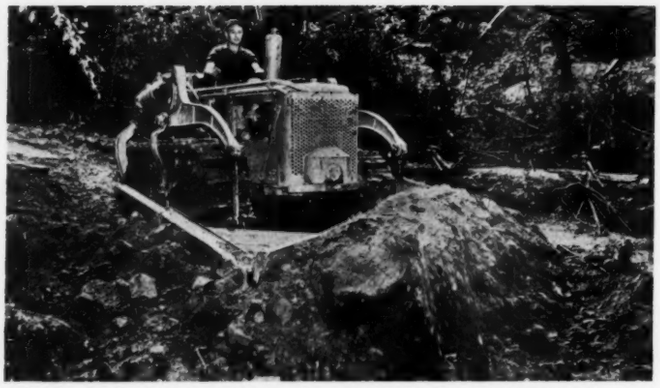
The new Mity Kat tractor and hydraulically controlled angledozer is one of the handiest machines on any job. A four-cylinder Hercules engine provides plenty of power, yet it's light enough and small enough to travel in a ¾-ton pickup truck.

The Mity Kat is equipped with a quick-reversing oil clutch which eliminates declutching to change direction of travel. Furthermore, this type of clutch has three to four times longer life than the conventional type of clutch under hard use.

Try the Mity Kat on your next job. Use it for light excavation or grading, in road construction and maintenance, and in trenching, snow removal, or a dozen other purposes. Wherever you need plenty of power in a small package, send for Mity Kat. Write for folder and name of nearest distributor.

DISTRIBUTORS:
Write for details. Certain territories available.

MITY KAT
Mfd. by MITY KAT TRACTOR CORP. MEDFORD, MASS.
211 CORPORATION WAY, MEDFORD 55, MASS.



Because it can quickly be angled to either side, tilted, or set square across, the Bullgrader blade offers advantages over the rigid fixed bulldozer blade. This International Bullgrader mounted on a TD-9 tractor is set at an angle to push dirt and rock to the left. For details circle No. 928 on card at page 18, or write to International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill.

This enormous air-inflated neoprene-nylon form is sprayed with layers of sand, cement, and water mixture to make a concrete "bubble building" structure. The technique is being used to build houses, storage plants, and other structures. The bubble-like form is re-usable. For details circle 926 on card at page 18 or write to Garrett Corp., 9851 Sepulveda Blvd., Los Angeles 45, Calif.

Texas Builds Soil-Cement Widening—2 Miles a Day*

P&H Soil Stabilizer Processes 9,000 Sq. Yd. Daily With Perfect Control of Quality

Close-up of P&H Model LA-88 Single Pass Stabilizer processing soil-cement.

Texas State Highway 79, originally built in 1928-29, was recently modernized in record time for today's traffic needs.

State Highway Officials decided the old 18-ft. pavement should be widened to 24 ft., for a total of 17 miles. Low-cost and maximum use of local materials were musts. Low bidder among nine contractors was Austin Asphalt Company, Dallas.

P&H Stabilizer Key to High Production

With the old shoulder soil removed to a 14-in. depth and an 8-ft. width on one side, 30 cu. yd. per station of crushed sandstone were dumped on

Behind the Stabilizer, two sheep's-foot rollers compacted the mixture.

the concrete pavement at regular intervals. This was bladed into the trench, watered and rolled for an 8-in. sub-base. Over this, 20 cu. yd. per station of crushed sandstone were placed to a 7-ft. width. Cement, for an 8% cement factor, was then spread, working no more than 1,000 ft. ahead of the P&H Soil Stabilizer as a guard against cement loss. Actually, this distance ahead was rarely reached, though, because of the high mixing speed which the Stabilizer maintained.

A More Stable, More Durable Base

Behind the cement spreader, the P&H Stabilizer pulverized the partially compacted sandstone, dry mixed it with cement, added the proper amount of water and deposited a uniform layer of soil-cement ready for immediate compaction.

Here curing seal is applied at the rate of 0.2 gallon per sq. yd.

Then, after curing, a 250 lb. hot-mix bituminous surface was placed over the old pavement and widening in two courses to complete modernization of this veteran road. The road was kept open to traffic throughout construction and the widening was opened to traffic as soon as the curing seal was blotted.

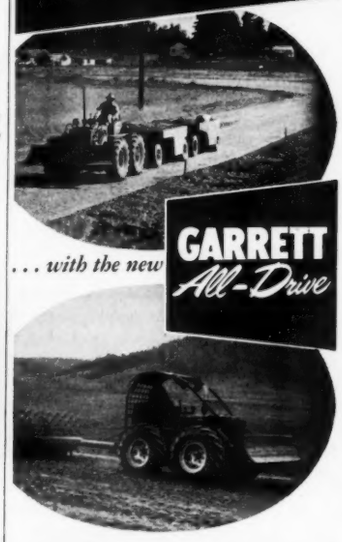
For more information on P&H "Single-Pass" Soil Stabilizers, write to C. R. Morgan Jr., P&H Soil Stabilizer Division, Harnischfeger Corporation, Milwaukee 46, Wisconsin.

Side view of P&H Model LA-88 Stabilizer. Only 1 man required to operate.

*The following data is based on a January, 1955 presentation to the American Road Builders' Association Committee on Soil-Cement stabilization by Mr. A. D. January, Wichita Falls, Texas, Senior Resident Engineer of the Texas State Highway Dept.

HARNISCHFEGER

SPEED UP HIGHWAY JOBS!



. . . with the new

RUBBER TIRES WITH 4-WHEEL DRIVE

—gives you a prime mover that really moves!

NO SACRIFICE OF POWER OR TRACTION! You actually get *more pull* from the All-Drive because there are fewer moving parts. 38.6 d.b. h.p.

NO DAMAGE to existing paving or curbs. Travels between jobs without loading or permits.

NO SERVICE PROBLEM. Major assemblies built by International Harvester. *All* parts available from International distributors.

FEWER REPAIRS because there's *so little vibration*. Operators like this feature, too!

Whether you operate one tractor or a hundred, you should get the facts on the Garrett All-Drive. See your dealer or write today to —

GARRETT DISTRIBUTORS
800 Stevenson Ave., Dept. F
ENUMCLAW, WASHINGTON, U.S.A.

For almost three years this Caterpillar trailer-mounted mobile electric set has been traveling throughout the country demonstrating its use for powering such equipment as electric shovels and rock crushers. Four new units patterned after this one are now available to supply from 155 to 300 kw. For details circle 929 on card at page 18, or write to Caterpillar Tractor Co., Peoria 8, Ill.

This LeTourneau Sno-Freighter, 274 feet long, will link isolated points in inland Alaska. Huge tires, mounted on LeTourneau Electric Wheels, drive the control car and five cargo cars independently. The control car has living accommodations, a control station, power plants, and fuel supply. For details circle No. 922 on card at page 18, or write to R. G. LeTourneau, Inc., Longview, Texas.

Rotary Concrete Finisher

■ A new leaflet describes the Superior rotary concrete finisher distributed by Dart Mfg. & Sales Co., 1002 S. Jason St., Denver, Colo. The machine uses one set of blades for floating and finishing.

Features emphasized include instant blade-pitch control up to a 30-degree tilt, a stationary guard ring that permits finishing closer to obstructions, a tangential arm mount, and an automatic-stop safety feature. Diameter of the blade's sweep is 42 inches.

To obtain this literature write to the company, or use the Request Card that is bound in at page 18. Circle No. 900.

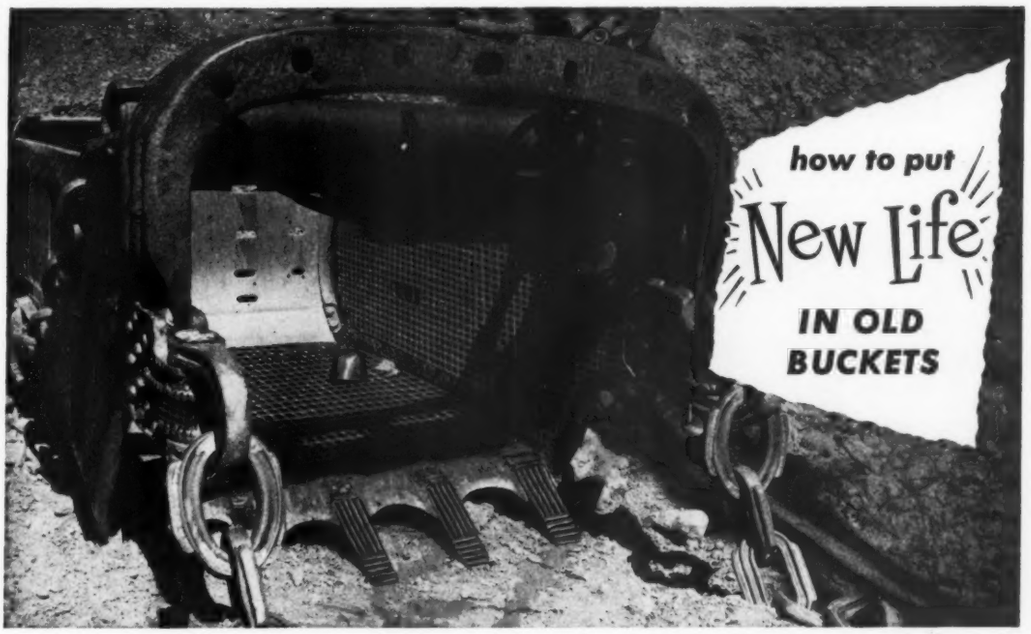
Special Representative Named by Harnischfeger

Coordinating sales activities for the P&H single-pass soil stabilizer and the P&H Sierra elevating loader is Ray Morgan, a new representative for the Power Crane & Shovel Division of Harnischfeger Corp., Milwaukee, Wis.

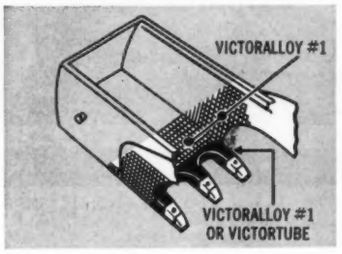
NEW!
PROPANE GAS BURNING FLOODLIGHT
6000 C.P.

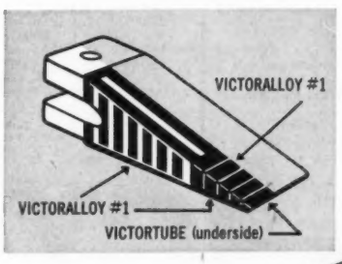
- Rugged, weatherized, easily portable, simple to operate, lights with a match.
- Burns 47 to 150 hours on 20 lbs. of gas. Adjustable gas pressure, ½ lb. to 15 lb., varies light to suit job. White light 6,000 c.p. Easily connected to standard 20 lb. gas tanks.
- Height, 48", including tank. Reflector diameter, 14". Weight, including full tank, 64 lb.
- Price $102.50 F.O.B. Chicago. Includes all equipment shown except gas tank.

WRITE, WIRE OR PHONE
Dealer Inquiries Invited
WM. W. LEE and SON
20 EAST JACKSON BLVD.
CHICAGO 4, ILLINOIS
Phones: HArrison 7-7592
HArrison 7-1720
Cable: Leelights



USE VICTOR HARDFACING





Buckets . . . Apply VICTORALLOY #1 to top and bottom of bucket lips in overlapping beads. Protect other parts or areas showing wear with stringer beads of VICTORALLOY #1. Use 3/16" coated VICTORALLOY #1 at 170 to 190 amperes, a.c. or d.c., or ¼" at 200 to 225 amperes. If wear is unusually severe, substitute VICTORITE on bucket lips; use 3/16" coated at 120 to 150 amperes, a.c. or reverse-polarity d.c.

Teeth . . . Apply VICTORTUBE to underside from point upward about 2", and VICTORALLOY #1 to upper side of tooth same distance. Use stringer beads of VICTORALLOY #1 on balance of upper and lower surfaces, and on edges. Use 3/16" coated VICTORTUBE at 130 to 160 amperes, a.c. or reverse-polarity d.c., and 3/16" coated VICTORALLOY at 170 to 190 amperes, a.c. or d.c.

Why guess? . . . Select the right alloy from VICTOR'S complete hardfacing line, made for both gas and manual or automatic arc application. New VICTOR illustrated hardfacing manual tells which alloys to use, how to apply. Ask your VICTOR dealer or write us today for your free copy.

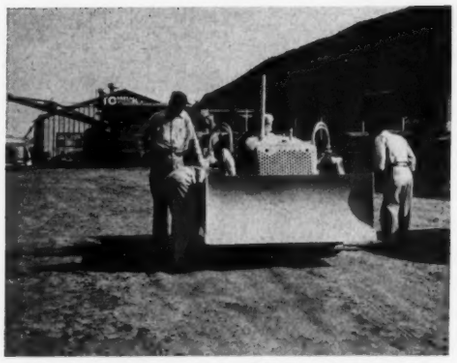
Profitable dealerships open; inquire now!

VICTOR hardfacing

VICTOR EQUIPMENT COMPANY
ALLOY ROD & METAL DIVISION
Mfrs. of welding & cutting equipment; hardfacing rods; blasting nozzles.
19-H
11440 So. Alameda St. • Los Angeles 59

Bargain day in big equipment

New York City dealer's first auction clears his yard, gives contractors a crack at some good buys, builds good will



While the auctioneer holds forth in another part of the yard, these prospective buyers look over a Caterpillar D2 which has been pulled out the lineup for demonstration and closer inspection. Contractors from 15 states and Canada were on hand for the sale.
C&E Staff Photos

"Hey, hey, hey, hey, hey, boys—got fifty-eight hundred, now somebody bid fifty-nine, fifty-nine, fifty-nine, fifty-nine—hey!"

It was auction day at the H. O. Penn Machinery Co.'s yard on the lower east side of The Bronx, New York City, and some 80 pieces of heavy construction equipment were going on the block. Tractors, bulldozers, scrapers, graders, shovels, and other big rigs were going to the highest bidder.

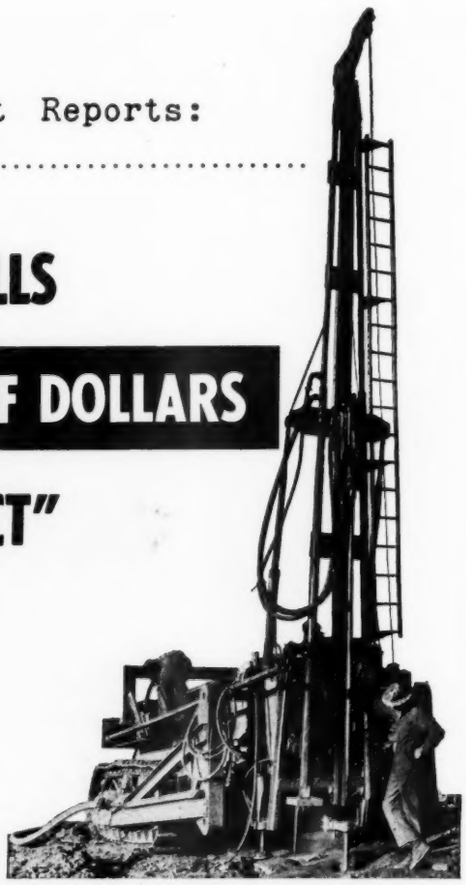
The auction, which took place on a bright sunny Saturday early last month, was the first held by Penn and the first in a long time—perhaps the first ever—in the New York City area. Several hundred bargain-hunting contractors, used-equipment dealers, and other interested persons from 15 states and Canada were on hand. Forke Bros. of Lincoln, Nebr., nationally known construction-machinery auctioneers, kept the bids coming and sold everything but the yard itself in 4½ hours.

For the record, the sale brought an unofficial total of $281,250, which the auctioneers believed was an equitable price for the lot. Of course some pieces went for less than had been expected, but others brought more—as is the case with any auction. The machinery, all of which was owned by Penn and had been reconditioned in its shop, ranged from practically new to fair condition. Almost every unit sported a new coat of paint and most looked ready to go to work.

The crowd was a stoical one, and though bidding seemed a little stiff (perhaps because equipment auctions are a rarity around New York City) there were some experienced auction-

Drilling Superintendent Reports:

"JOY CHALLENGER DRILLS SAVED THOUSANDS OF DOLLARS ON OUR DAM PROJECT"



Two Joy TWM-3 Challenger Hammer Drills were tried on this project after difficulty had been experienced in maintaining drilling schedules. Six 4" Wagon Drills had been barely able to keep the 3-yard shovel in rock.

The Two Joy Challengers not only easily kept ahead of the shovel, but also reduced labor and powder costs. The contractor was so impressed with this performance that he added a *third* Challenger when it became necessary to increase the depth of cut to 100 ft.

The drilling superintendent then enthusiastically reported that he was saving his company "thousands of dollars" by being able to make this deep cut so economically with his Challenger drills. The table at right compares production figures of the two types of drills.

The revolutionary TWM-3 Challenger is a "package" unit for mounting on a used crawler-tread tractor or similar vehicle. The package consists of mounting brackets, mast, and a powerful 5¼" hammer drill . . . the largest ever built. Maximum hole size is 4½".

For complete details on the Joy Challenger, write for Bulletin 87-U to ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario*

DRILL PERFORMANCE Wagon Drill vs. Joy Challenger		
	1 Wagon Drill	1 Challenger
Bit Size	2½"	4"
Hole Spacing	6' x 6'	15' x 15'
Hole Depth	24' (max)	35' to 40' (later 100')
Footage drilled per shift	200'	180'
Yardage per foot drilled	1⅓	8⅓
Yardage per shift	270	1400

Consult a Joy Engineer

for AIR COMPRESSORS • ROCK DRILLS • WAGON DRILLS • CORE DRILLS • BLASTHOLE DRILLS • PORTABLE HOISTS • FANS BLOWERS • HYDRAULIC HOSE AND COUPLINGS

W&D-C5536

JOY

CONSTRUCTION EQUIPMENT MANUFACTURERS FOR OVER HALF A CENTURY

This "No Contact" feature REDUCES UP KEEP $ $ $ SAVES YOU MONEY

In a Hayward, there's no contact between the closing mechanism and the material handled. This "no contact" feature is a very important one to you—since it means much less wear, reduced upkeep, and a significant dollar-saving in bucket maintenance.

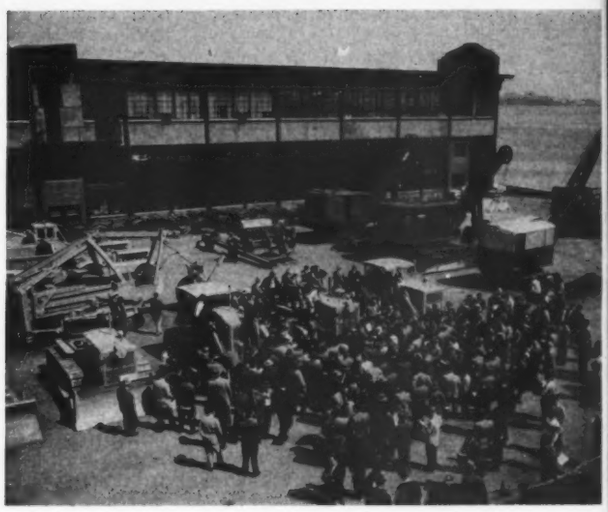
THE HAYWARD COMPANY
50 Church St., New York 7, N. Y.

HAYWARD BUCKETS

CLAM SHELL • ELECTRIC • ORANGE PEEL • GRAPPLES

famous for performance since 1888

Part of the crowd of bargain-hunting contractors and others interested in heavy equipment listens attentively as a D8 with dozer goes on the auction block at the H. O. Penn Machinery Co.'s yard.



Another view of the auction yard, showing shovels, cranes, and other big earthmovers which were sold to the highest bidder. More than 80 pieces of equipment brought a total of $281,250 in the 4½-hour sale.

goers on hand. Much of the bidding was done simply by a casual nod or a slight gesture of the hand in response to the auctioneer's invitation. Those who weren't bidding were busy keeping track of the prices paid for the various items.

This business of keeping a record of the prices is an important feature of used-equipment auctions; contractors and dealers watch these sales closely to find out what various used machines will bring. Guessing at the sale price of a particular unit is a kind of a game these auction-goers play, too.

Some Prices

The highest price paid for any one item was $18,100—the price per unit for three identical Caterpillar DW21 motor scrapers. These machines had serial numbers 8W 260, 8W 355, and 8W 373, and were advertised as having done very little work and being in "excellent" condition. Bidding, although at the price of one unit, was on all three machines.

White Oak Excavators, Inc., Plainville, Conn., bought the scrapers, along with a Bucyrus-Erie 43-B 1¾-yard shovel (serial number 14144) for $7,500; a Rex 34-E dual-drum paver (on which Penn declared it had spent $8,556 to put the rig in "first-class" working condition) for $6,200; and some smaller items. Altogether, the Connecticut firm spent $72,331 at the sale.

The second biggest spender of the day was Five Boro Construction Corp., a New York, N. Y. firm which

(Concluded on next page)

Miller SWIVELS for Blocks

As adapted to blocks, MILLER Ball Bearing Swivels prevent loads from spinning and fouling the lines. Miller Swivels turn freely under heaviest loading (capacities to 250 tons). Small Miller Swivel on dead end simplifies restringing —no line twist or kinking.

Let us work with you to adapt Miller Swivels to your particular needs.

Write for Catalog and Prices

GENERAL MACHINE and WELDING WORKS, Inc.
P. O. BOX 938, POMONA, CALIFORNIA

Oliver "OC-12" with hydraulic 1-yd. loader. This model has the long track frame for added stability. Loader has exceptional bucket rotation and 10' 4" loading height.

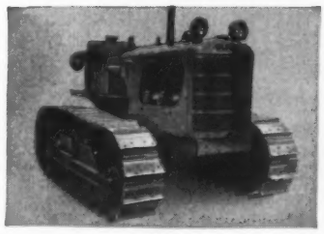
Another great tractor by Oliver ...THE POWERFUL "OC-12" CRAWLER!

It's a rugged, eager worker in the 45 drawbar h.p. class that features advancements in power, economy and operating ease to make every job more profitable.

The "OC-12" offers two engines of exceptional torque span—diesel or gasoline. Both engines have instant electric starting, pressure cooling, by-pass thermostat and full-flow oil system to insure quick starting and long, low-cost service.

The smooth lines of this unit show it is made for easy access and operator visibility. Controls are right where they're the handiest. Down to the key-lock switch, foam rubber seat, overhead-linkage clutch, this tractor caters to operator convenience.

Your Oliver Industrial Distributor will be glad to demonstrate the "OC-12." Give him a call.



The "OC-12" is available in two track widths: 44- and 60-inch—and two track lengths, one with four lower track wheels and one with five. Standard grousers are 14-inch.

Here is the "OC-12" with hydraulic bulldozer. Hydraulic pump is front mounted. Special protective grille is part of 'dozer frame. Blade has provision for tilt adjustment.

THE OLIVER CORPORATION
400 W. Madison Street, Chicago 6, Illinois

a complete line of industrial wheel and crawler tractors

(Continued from preceding page)

paid $9,700 each for three LeTourneau E-18 Tournarockers with CT Tournapulls. All three machines were advertised as having been used only part of one season.

Among other big sales was that of a Bucyrus-Erie 38-B 1½-yard shovel (serial number 46201) for $17,500 to Peter Salvucci & Sons, Inc., Waltham, Mass. The machine was advertised as in "good" condition throughout "although the tracks would require some work after another season's operation."

Nearly half of the items up for sale were tractors, with the majority being Cats. Others included Internationals, Allis-Chalmers, Olivers, and a Case. Prices ranged downward from $9,000 for a Cat D8 with dozer (serial number 8R 7734) in "very good" condition to $300 for a Case C industrial tractor with Hough sweeper (serial number 333377C) in "fair" condition.

Comic Relief

The only "clunker" in the lot was also a tractor—or what was left of one. A Cat D8 (serial number 1H 6563SP) with LeTourneau angle dozer, it was advertised frankly as "not in working condition" but as "excellent for parts salvage." It was the last item to go on the block, and its sale provided many a laugh for the crowd.

Avery Forke, who auctioned the entire lineup of equipment, started off the sale of this relic with a bit of understatement: "Boys, this machine needs a few repairs, whether it looks like it or not." The machine actually looked like a heap of smoldering metal; cables were frayed, the dozer blade was chewed up, and as one bystander commented, it looked as if it had been dragged to its spot in the yard.

Later, Forke stopped the anything-but-spirited bidding on this item to admit that "this machine is guaranteed not to run." Nonetheless, the item brought $625.

Four graders were among the heavier equipment sold. The highest price paid for one of these units was $13,800 for a Caterpillar No. 12 (serial number 8T 14362) advertised as "practically new." The catalog listed new price on this unit as $16,500. A Gar-Wood 625 scraper (serial number 248) advertised as in "very good" condition brought $7,300, with original cost listed as $18,000.

An Allis-Chalmers HD-19 diesel tractor (serial number 2619) with Gar Wood bulldozer and cable control unit brought $5,800, and other A-C diesels went for $3,600, $3,400, $3,100, and $1,500. Cat D8's brought anywhere from the $9,000 high to $3,100 for a "good" machine (serial number 8R 3307) with LeTourneau power control unit. One D8 (serial number 2U 13429) advertised as in "good" condition went for $8,700.

A P&H Model 200, ¾-yard truck crane (serial number 5900) mounted on a Federal chassis was advertised as in "very good" condition, and went for $4,000. An Adnun stone spreader (serial number 1909) cataloged as in "good" condition brought $3,100. Lowest price of the entire sale was $25, paid for an Anderson SW-38V V-type snowplow with hand hydraulic lift.

Completely Above Board

Prior to the sale—and intermittently during the event itself—the auctioneers stressed the fact that no minimum sale price had been established by the seller. All machines were to go—and did go—to the highest bidder, without Penn or the auction firm bidding on a single item. It was cash on the barrelhead for each and every machine, with accounts being settled by check or cash immediately after each sale.

Contractors present registered approval both of the equipment and of the way in which the sale was conducted, judging by a sampling of opinion. Most remarked that it was difficult to compare the prices with those at other auctions, the condition of equipment varying as it does. But they seemed satisfied that Penn had staged a good sale.

And Ralph L. Johnson, president of H. O. Penn Machinery Co., feels the sale was a success. Besides clearing the dealer's stock of used equipment (with the exception of five or six pieces that couldn't be moved out of the shop fast enough), the sale generated some good will for the distributor.

Auctions may be here to stay in the New York City used-equipment market. THE END

Firms Add Euclid Line

Sales, parts, and service on Euclid earthmoving equipment are being offered by two companies new to the dealer lineup of Euclid Division, General Motors Corp., Cleveland 17, Ohio.

Evans Engine & Equipment Co., 1230 Westlake, N., Seattle, Wash., is covering western Washington and the Territory of Alaska for the division. C. R. Evans and B. F. Evans are president and vice president of the dealership, respectively.

General Diesel & Equipment Co., Williston, N. Dak., represents Euclid in North Dakota and in Clay County, Minn. W. A. Sweeney heads the firm.

Galion Distributor

C&M Equipment Co., Minneapolis, Minn., has been appointed a distributor of dump bodies and hydraulic hoists made by the Galion Allsteel Body Co., Galion, Ohio.

The dealer, located at 1708 Central Ave. N. E., Minneapolis, offers hoist and body installation service, plus parts and maintenance service. President of the firm is C. K. D. Minar.

This contractor mounts his Handy-Huts on skids and drags them to new locations on a vast construction project. The basic building is 10′ wide. Length starts at 8′ and is unlimited in 2′ multiples. Patented wedge and clip method of attachment eliminates the need for puncturing top roof or side sheets. May be dismantled many times without damage and re-erected anywhere. Use them for field offices, tool sheds, explosive storage, any of 1000 uses. You can also obtain garage doors, various door and window combinations, interior partitions, etc. Suit this Handy-Hut to your needs and save money everywhere you need a small building.

GENERAL UTILITY BUILDINGS
26′-30′-40′ SPANS

For larger requirements, check USF's larger, fully prefabricated, all-steel buildings for single or multiple use. All feature a variety of side and end treatments allowing full versatility of use. USF 40′ buildings feature rigid frame construction. Write for complete literature.

United Steel Fabricators, Inc.
WOOSTER, OHIO

MULLER MIXERS *and* POWER TROWELS
set quality standards in their fields

Muller's earliest objective—to make the best possible plaster and mortar mixer and sell it for the lowest possible price—was achieved by: (1) specialization on a few models . . . (2) careful selection of materials and components . . . (3) experienced workmanship . . . (4) sound distribution methods. Other Muller Machines, also, rank high in their fields for the same reasons.

PLASTER AND MORTAR MIXERS
Made in 2, 3½, 6, 6 to 8, and 9 cu. ft. sizes. Electric motor or gas engine power. All models have Muller Lifetime Paddle Shaft Seal to protect bearings. Power throwouts on smaller models, built-in disc clutch on larger. Many other features. Priced $180 to $996 FOB Factory. Rubber scraper blades are available for all sizes.

CONCRETE MIXERS
3 models, 3 to 6 cu. ft. capacities, tilting type. Ample size drums, fast mixing action, Timken Bearings, electrically welded, sturdy construction throughout. Power—electric motor or Briggs & Stratton Air Cooled Engines. Prices $230 to $660, FOB Factory.

POWER TROWELS
2 sizes—29″ diameter, 1¾ HP; and 34″, 2¼ HP Briggs & Stratton Engines. Stationary guide ring eliminates hand troweling when finishing along baseboard. Engine speed regulated by governor control on handle.

SEND FOR INFORMATION FOLDERS AND NAME OF LOCAL DEALER

MULLER MACHINERY COMPANY, Inc.
Metuchen 15, New Jersey
Cable Address, MULMIX

The office and parts building of Murphy-Campbell Co., Tacoma, Wash., stands gutted by a Friday-night fire. But by Monday morning, fast work by the Caterpillar parts department at Joliet, Ill., had the dealer back in business again.

Cat Dealer Reopens Three Days After Fire

A fast record-sleuthing job by Caterpillar parts department personnel at the Joliet, Ill., plant proved the best kind of fire insurance for customers of Murphy-Campbell Co., Caterpillar dealer at Tacoma Wash. Though the dealer lost its complete stock of parts in a $100,000 fire which raged through the office and parts building on a Friday night, it was back in business again on Monday morning, offering almost all parts stocked before the fire.

For the two days after the fire, a Saturday and Sunday, the Joliet parts department worked under the direction of H. H. Bosecker to reconstruct all Murphy-Campbell parts orders through 1954. From these, personnel were able to tell which parts had been called for throughout the year, and the number of each type of item needed to meet the dealer's demands for the next three months.

With this information, the parts department began shipments to the dealer's new location, just 10 blocks away from the old office, which a contractor had made available to the company. Murphy-Campbell, protected by fire insurance, suffered no financial loss.

Parts were secured from two neighboring Caterpillar Dealers, Collins Machinery Co., Seattle, and Interstate Tractor & Equipment Co., Portland, and shipments from Caterpillar parts depots at Spokane, Wash., and San Leandro, Calif., supplemented emergency shipments from the Joliet factory and enabled Murphy-Campbell to reopen early Monday. Parts which had previously arrived in Tacoma by rail had not been unloaded were sold directly from the freight car that morning by the dealer.

Pioneer Engineering Appoints Two Dealers

Two distributorships have been authorized by Pioneer Engineering Works, Inc., Minneapolis, Minn., to handle the line of Continuflo conveying, feeding, crushing, screening, washing, and asphalt equipment. Serving western New York State is Brock Tractor Co., Buffalo, N. Y. All of Mississippi, northeastern Arkansas, and western Tennessee will be served by Choctaw, Inc., Memphis, Tenn. Pioneer is a subsidiary of Poor & Co., Chicago, Ill., manufacturer of construction machinery.

The New York dealer, which also handles Allis-Chalmers, Link-Belt Speeder, Tractomotive, and Baker equipment, is located at 1989 Harlem Road. Bertram M. Brock heads the company, Richard J. Konkel is vice

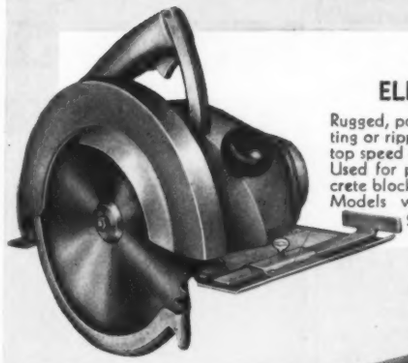
EASY DOES IT with MILLER Tilt-Top!

Big, heavy dozers, Barber Greene trenchers, rollers up to 10 tons and other massive construction equipment are loaded by ONE man in less than TWO minutes on a MILLER Tilt-Top. So easy too! Ground and platform merge into one surface for the easiest, fastest loading yet designed. Safer too, big wide oak decked platforms assure maximum operator and equipment safety. To cut time between jobs get a MILLER Tilt-Top.

Model "BT-10" 10 TON
EQUIPMENT INCLUDED: platform, four 8.25x20x12 ply tires, heavy duty electric brakes with automatic electric break-away switch and controls, tires, lights, reflectors and safety chains.

SEE YOUR DISTRIBUTOR OR WRITE!
MILLER research engineers
456 S. 92nd Street, Milwaukee, Wis.

There's Extra Economy on Construction Jobs That Use ... SYNTRON POWER TOOLS



"Belt Driven" ELECTRIC SAWS
Rugged, powerful saws for cross-cutting or ripping hard or soft wood at top speed without bucking or pulling. Used for production cutting of concrete block, plaster board, etc. Two Models with 8" or 10" blades—2-13/16" and 3-1/4" cuts.

"Electric" HAMMER DRILLS and HAMMERS
Automatic, self-rotating Hammer Drills that cut through concrete ten times faster than by hand. Electromagnetic operation - practically no maintenance. Electric Hammers for low cost cutting, chipping, pointing, scaling, etc.

"Self Contained" GASOLINE HAMMERS
PAVING BREAKERS and ROCK DRILLS
Require no air compressor or accessories. Deliver 2000 powerful blows per minute for digging, tamping, busting or drilling in paving, clay, shale, rock, etc. Bit rotates automatically for drilling.

"Mass and Form" CONCRETE VIBRATORS
Electromagnetic models that clamp directly to sides of wall forms for high speed settling on form jobs. Gasoline or electric models for mass vibration.

Write today for complete tool catalogue - FREE
SYNTRON COMPANY
227 Lexington Ave. Homer City, Pa.

SAVE TIME, MONEY, LABOR WITH THESE STURDY PUMPS

★Just turn the high pressure hose on that heavy equipment for a quick clean-up. The solid, hard, driving, high pressure stream from a Hardie Powered Pump Unit will strip off the caked mud, grease, dirt—even that "behind the ears"—in a matter of seconds.

★The Hardie Spray Gun is readily adjustable by a pressure of the fingers from solid stream to a high pressure spray for over-all washing, or a fog like mist for fragile things and fog fire fighting.

★Hardie builds powered pump units in many sizes and models. Enclosed units from 5 gpm at 300 psi to 24 gpm at 400 psi. On casters or skid mounted units up to 60 gpm at 800 psi. Handle all liquids, chemicals, semi-liquid materials. All Hardie pumps are trouble-free, rugged, vertical piston-type pumps that work to their ratings smoothly, quietly, at slow speed.

Enclosed unit. All working parts are readily accessible.

Model LC—Delivers 50 gpm at 800 psi.

Model XCVA—Delivers 18 gpm at 600 psi.

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The Hardie Manufacturing Co., Hudson, Mich.
2538 Santa Fe Ave., Los Angeles 58, Calif.
1435 N. W. Northrup St., Portland 9, Ore.
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Please send Pump Catalog.
Name _____
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president and sales manager, and I. R. Derbyshire is treasurer. Brock's service manager is Walter Evaniak, and parts manager is Hubert C. Miller.

The Choctaw firm is headed by T. B. Daniels, president; W. L. Quinlen, vice president and general manager; J. L. Nellis, vice president; and O. H. Miller, Jr., secretary. Leonard Peters is service manager, and Raymond Wolf, parts manager. Carl Vines is manager of the Jackson, Miss., branch, and Michael Thomas is manager of the Little Rock, Ark., branch.

Sales and Service Meeting Held by Highway Trailer

A plant tour, product review, and field demonstration of the new swing base earth-boring machine highlighted the two-day sales and service conference held for dealers at the Edgerton, Wis., headquarters of Highway Trailer Co.

The center of interest for dealers was the newly developed earth-borer which swings in 180 degrees and works at any point within this arc. Other new engineering and design features of Highway machines were outlined at the meeting by H. C. Stricker, Jr., chief engineer, and George Connors, design engineer. Opening the conference was Highway Trailer Co.'s president, Harold J. Meagher.

A product review of Highway truck bodies, pole and cable reel trailers, earth-boring machines, and allied equipment, was conducted by R. E. Hull, utility sales manager.

Northwestern Firm Adds Davenport Besler Line

Davenport-Frink Sno-Plows have been added to the lines of equipment being distributed by Air-Mac, Inc., in the state of Washington and in northern Idaho. The dealer now has new modern sales and service plants in Seattle and Spokane, Wash., for handling this equipment manufactured by Davenport Besler Corp., Davenport, Iowa. S. B. McDonald is president of Air-Mac, Inc., of Washington and Air-Mac, Inc., of Oregon. A. H. Campbell is in charge of the construction and road-equipment division for the firm.

New Hyster Distributor

A new western Michigan dealer for the Hyster Co., Portland, Oreg., is Miller Equipment Co., 538 Bond Ave. N. W., Grand Rapids. The Miller organization will handle Hyster's line of lift trucks, mobile cranes, platform trucks, and straddle trucks.

J. P. Waite, Inc., will continue to serve the western portion of the state on the northern peninsula, and Bentley & Hyde and Cleveland Tramrail Toledo Co. will represent the manufacturer in the rest of Michigan.

Dealer for Cleaver-Brooks

Ruffridge-Johnson Equipment, Inc., Minneapolis, Minn., is a new Cleaver-Brooks dealer for the eastern section of Minnesota and fourteen counties in northwest Wisconsin. Located at 3024 Southeast Fourth St., the dealer will handle the oil, gas, or combination-fired boilers manufactured by Cleaver-Brooks, Milwaukee, Wis., as well as the company's line of equipment used in construction work.

New Huber-Warco Dealers Located in Seven States

New Huber-Warco dealerships have been opened in seven states to handle the complete line of rollers and graders manufactured by the Marion, Ohio, equipment firm.

Elphinstone, Inc., 6212 Belair Road, Baltimore, is the Maryland distributor, and Long-Talbott Equipment Co., 820 Blossom St., Columbia, will handle Huber-Warco's equipment in South Carolina.

In Texas, the firm is represented by Boehck Engineering Co., Inc., 5806 Long Drive, Houston, and in Connecticut, the dealer is Wilhelm-Davies Co., Inc., N. Colony Road, Wallingford. Kessler-Simon Machinery Co., 1545 Exchange Ave., Oklahoma City, Okla.; R. B. Wing & Son Corp., 384 Broadway, Albany, N. Y.; and Dempster Bros., Inc., 312 W. Springdale Ave., Knoxville, Tenn., complete the roster of new dealers.

New A-C Distributors

Allis-Chalmers Mfg. Co., Milwaukee, Wis., has added three outlets to its dealer organization. Bickford & Francis Belting Co., Inc., 35 Pearl St., Buffalo, N. Y., will handle Texrope V-belt-drive equipment in seven western New York counties. The dealer firm is headed by Andrew Thompson.

Power Service, Inc., 355 S. Ash St., Casper, Wyo., is the new distributor for Allis-Chalmers motors and transformers in 18 Wyoming counties and 9 Nebraska counties. The firm, organized little more than a year ago, is headed by C. W. Sissman.

Both A-C motors and Texrope V-belt drive equipment is being handled by the third distributor, The George A. Mathewson Co., 101 Edison Place, Newark, N. J. The company, headed by George A. Mathewson, will cover Essex County.

Hensley Appointment

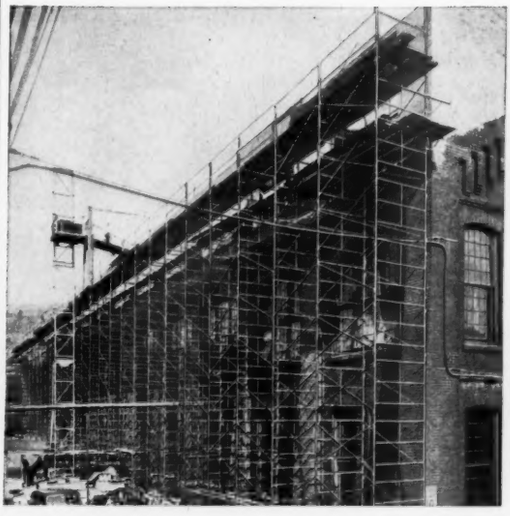
Four dealerships have been established by Hensley Equipment Co., San Leandro, Calif., manufacturer of tractor-dozer and scraper rippers, cutting edges, bottom-track rollers, and allied equipment.

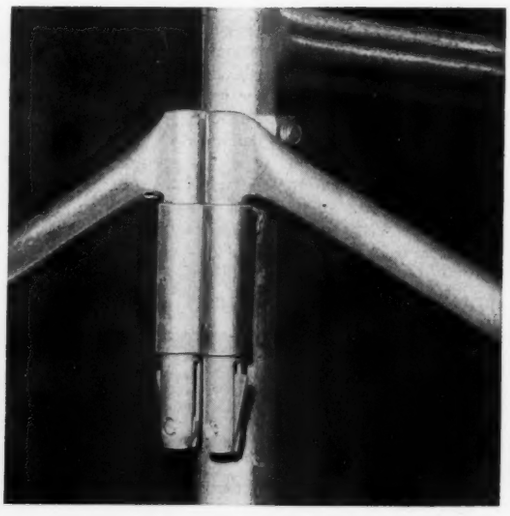
Two dealers on the Pacific coast are Western Traction Co., Sacramento, Calif., and Pacific Hoist & Derrick Co., Seattle, Wash. The area around Atlanta, Ga., will be handled by General Machinery Corp., Atlanta. The fourth dealer, a Canadian firm, is Columbia Equipment, Ltd., Vancouver, B. C.

BIGGEST NEWS IN

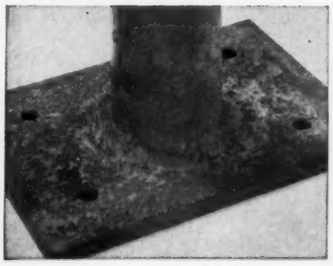
Now—for the first time

EVERY PANEL, EVERY BRACE, EVERY SINGLE COMPONENT PART OF

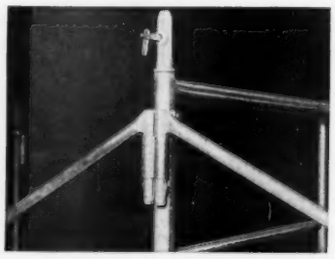




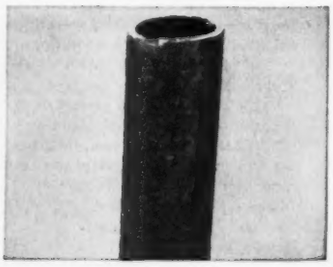
NO MORE RUSTING—Your scaffold will work faster, look better on the job, and definitely last longer



No More Pitting—Gone are the curses of rust-pits that eat into scaffold steel. Construction men and mason contractors well know how these rusted, rough surfaces slow down erecting and dismantling. Now, Universal's protecting galvanized surface assures faster operations and cleaner-looking scaffolding.



Rust-Free, Lubricated Surfaces—The smooth surface that galvanizing provides, acts as a lubricant when fitting braces and connections. Further, mortar won't cling as readily to cleaner-surface zinc galvanizing—and your Universal Scaffold will constantly work better to give you more job profits.



No Costly Rust Deterioration—The galvanized surface on every part of Universal Scaffolding provides a lasting protection that will greatly lower your maintenance and reconditioning costs. Since rust and corrosion are eliminated, the life of your Universal scaffold on the jobs will be multiplied many times.

SEE YOUR LOCAL UNIVERSAL DISTRIBUTOR FOR IMMEDIATE DELIVERIES

CONTRACTORS AND ENGINEERS

Use the
Request Cards
Between
Pages 18 & 19
To Obtain
Further
Information
or Printed
Matter on
Any Product
Advertised
or Described
Editorially
in This
Issue

Use the Request Cards Between Pages 18 & 19 To Obtain Further Information or Printed Matter on Any Product Advertised or Described Editorially in This Issue

Two Distributors Named By The Prime-Mover Co.

Loggers & Contractors Machinery Co., Portland and Eugene, Oreg., is a new dealer for the ¾-ton powered wheelbarrows manufactured by The Prime-Mover Co., Muscatine, Iowa. The company will handle Prime-Mover sales in Oregon and southern Washington.

Northern Commercial Co., Seattle, Wash., has been made a distributor for Alaska by Prime-Mover.

Exclusive Fairfield Dealer

The Fairfield Engineering Co., Marion, Ohio, has appointed United Sales Co., Staten Island, N. Y., as exclusive sales agent in the U. S. and Canada for the portable builder conveyor and related conveyor equipment for contractors and roofers.

Headed by Joseph Halperin, former vice president of Aeroil Products Co., the dealer firm has James C. Savino as sales manager.

LeTourneau-Westinghouse Signs Three Dealers

Three new distributorships set up by LeTourneau-Westinghouse Co., Peoria, Ill., are now handling the company's line of high-speed rubber-tire earthmoving equipment in the midwest.

Columbus Equipment Co., 50 E. Kingston Ave., Columbus, Ohio, is covering central Ohio. W. F. Early is president and treasurer of the firm, Vern Wheeler is vice president and sales manager, and Joseph J. Bedel is secretary. The firm also serves as a distributor for Lima, Austin-Western, Trojan, Heltzel, Esco, Willard, Pitman, and Detroit Diesel Equipment.

Signing the sales and service agreement which makes his company one of the newest LeTourneau-Westinghouse distributors is W. F. Early, president and treasurer of Columbus Equipment Co., Columbus, Ohio. Seated at left is John W. Schoen, vice president and general sales manager for LeTourneau-Westinghouse. Standing, left to right are George Summers, district sales representative, and J. A. Vincent, eastern sales manager for LeTourneau-Westinghouse.

Covering Eastern Iowa for LeTourneau-Westinghouse is Choate Equipment Co., U. S. 30 and Iowa State Route 149, Cedar Rapids, Iowa. This firm, headed by John H. Choate, president and sales manager, has Roy E. Choate as secretary-treasurer and Marvin C. Nelson as vice president and credit manager.

The distributor in the St. Louis area—which includes eastern Missouri and southern Illinois—is O. B. Avery Co., 1345 Macklind Ave., St. Louis. O. B. Avery, Sr., and O. B. Avery, Jr., head the firm, and Paul Zimmerman is sales manager.

Firms Handle Clark Line

Dealers in Missouri, in North Dakota, and Minnesota now supplement Clark distributor outlets for the Michigan line of excavator cranes manufactured by Clark Equipment Co., Buchanan, Mich.

Charles Dunn Machinery, Inc., 1915 Locust St., Kansas City, Mo., will handle the line in western Missouri and eastern Kansas.

The Fargo office of Midwest Equipment Co., located at 501 N. Fourth Street, will cover counties in eastern North Dakota and eight counties in Minnesota. The company's Bismarck, N. Dak., office will cover counties in western North Dakota and five counties in Montana.

The south Minnesota territory will be served by Mork-Witthauer Equipment Co., 2518 University Ave. S. E., Minneapolis.

Worthington Corp. Dealer

New Hampshire Explosives & Machinery Co., Inc., Concord, N. H., is handling the Worthington line of portable compressors and contractors' tools in the entire state of New Hampshire for the Worthington Corp., Harrison, N. J. The distributorship was established through an agreement with Worthington's portable compressor and contractor's tool division at Holyoke, Mass.

Buck Dealer in Ohio

The line of trailer-mounted and truck-mounted hoisting machines made by Buck Equipment Corp., Cincinnati, Ohio, is being sold and serviced by W. T. Walsh Equipment Co., 12750 Berea Road, Cleveland, Ohio. H. T. Baker heads the company.

SCAFFOLD HISTORY
AT NO EXTRA COST!
UNIVERSAL SCAFFOLDING—INCLUDING THE FAMOUS "GRAVITY-LOCK"

THE MOST WANTED AND MOST NEEDED IMPROVEMENT IN THE INDUSTRY! A LUBRICATING GALVANIZED SURFACE THAT PROTECTS AGAINST THE HARMFUL WORK-DETERRING ACTION OF RUST—TO SPEED UP ALL YOUR SCAFFOLD WORK.

Here, at last, is the wonderful result of long experimental research, to bring to scaffold users all the benefits of zinc galvanizing—at no increase in cost. It is bound to be welcomed as a most important contribution to the construction industry. Universal Manufacturing Corporation, world's largest producer of steel-panel scaffolding, is now applying on every single component of Universal Scaffolding, a perfected zinc-galvanizing that provides a clean, smooth, rust-preventive and lubricative surface.

At last, RUST, the age-old curse of the scaffold business is satisfactorily disposed of—once and for all.

How does this benefit you, the scaffold user? It simply means that the harmful effects of rust and corroded rough surfaces will no longer slow down your scaffold erection and dismantling. It means that you can count on substantial reductions in the costly recurring expenses of maintaining and reconditioning your scaffold. It means your scaffolding will work faster, look better on the job, and last longer. In short, with this important new development, ***you can now count on more profits.***

We welcome inquiries from scaffold users in seawater coastal areas, or in chemical installations, where corrosion is an important consideration.

Investigate today—see your local Universal distributor who can arrange for immediate deliveries.

Send for free Literature on:
EZEBILT & LADSCAF Steel-Panel Scaffolding
AMERICAN-TUBULAR Elevating Towers
AMERICAN-UNIVERSAL Safe-Seating Bleachers

Another Important "FIRST" by the Pioneers of the Only Automatic-Locking Brace—"Gravity-Lock"

UNIVERSAL MANUFACTURING CORP.
"World's Largest Producer of Steel-Panel Scaffolding"
ZELIENOPLE 1, PA.

Taking over the command of the 439th Reserve Fighter Bomber Wing from Brig. Gen. Felix L. Vidal, left, is Lt. Col. Richard M. Thorburn, vice president of the W. H. Anderson Co., Detroit, Mich.

Col. Thorburn Commands Michigan's Wolv-air-ines

Lt. Col Richard M. Thorburn—in civilian life an officer of W. H. Anderson Co.—is serving as acting commander of the 439th Reserve Fighter Bomber Wing.

The vice president of the construction machinery distributor was named to the post after Brig. Gen. Felix L. Vidal, commander of Michigan's Wolv-air-ines, was recalled to active duty at Continental Air Command Headquarters at Mitchel Air Force Base, N. Y. Col. Thorburn, a veteran of World War II, is a graduate of the Royal Military College, Sandhust, England.

F. W. Gartner, Jr., Named Partner in Houston Firm

G. W. Gartner, Sr., head of the F. W. Gartner Co., Houston, Texas, has a new partner in his nephew, Fred W. Gartner, Jr., son of the founder. Fred Gartner, who will act as manager of general operations, has been associated with the company for the last 20 years.

The firm, one of the largest rental equipment houses in the city, recently celebrated its 32nd anniversary in business. With headquarters at 3805 Lamar Avenue, and a warehouse at 1010-20 Milby Street, Gartner maintains a concrete-demolition department and protective-coating department supplementing its other services.

Now a partner in the firm of F. W. Gartner Co., Houston, Texas, is Fred Gartner, Jr., son of the founder.

YOU'RE LOSING MONEY

CLIP THIS COUPON AND MAIL

GET THAT HORSE AND BUGGY OUT OF YOUR OFFICE

MOMAR INDUSTRIES
4323 W. 32nd Street
Chicago 23, Ill., U.S.A.

☆ Ship us _____ GLIDER PRINT RACKS @ $89.50 including 12 Holders
☆ Ship us _____ GLIDER PRINT RACK EXTENSIONS @ $79.50 including 12 Holders
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☐ Mail us a complete, illustrated brochure on GLIDER BLUE PRINT RACK PRODUCTS

Firm _____
Address _____
City _____ Zone _____ State _____
By _____ Title _____

SAVE MONEY AND WASTED TIME
by Replacing Your
OLD-FASHIONED BLUE PRINT RACK
with a Modern, Efficient

Glider
BLUE PRINT RACK

Patents Pending

5 Ft. Hi., 4 Ft. Wd., 3 Ft. Dp.
$89.50
per Unit including 12 Plan Holders

20 Exclusive Features including

- No Holes to Punch . . . Replace Any Sheet without removing other sheets.
- Just Glide In . . . Glide Out.
- Holds Various Sizes of Prints and Thicknesses of Sets
- Can Hold as Many as 1500 Prints
- PLUS 16 MORE FEATURES

Order Your Glider
Blue Print Rack Today
or Write for Illustrated Brochure

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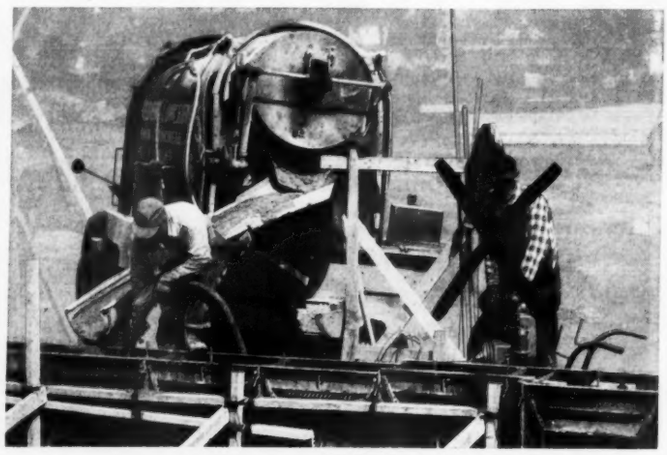
4323 W. 32nd St., Chicago 23, Ill.
LAfayette 3-1633



NEW MASTER "1-MAN" VIBRATOR CUTS VIBRATING COSTS IN HALF

Only 25 lbs. Easy to handle.

It weighs 25 pounds! It's all in one piece! It plugs into any regular 115 Volt AC or DC electric line . . . and with no heavy engine or motor to drag around, one man handles it easily.

The motor is sealed in the vibrating head, so there's no flexible shaft to get out of whack; no oiling or greasing problems; no kinking troubles.

No field maintenance is necessary: when motor head needs attention, snap it off and snap on a spare.

The vibration actually penetrates farther and leaves fewer voids in the concrete than old-style vibrators.

The price is *low*. The design has eliminated so much cost, and no special power source is required, but the big saving comes in use. Write for folder or ask your Master distributor for a free demonstration. You'll see exactly how the Master "1-Man" can cut your vibrating costs *at least* 50%.

MASTER VIBRATOR COMPANY
154 Stanley Ave., Dayton 1, Ohio

MASTER

GIVE TO CONQUER *Cancer*

"Pipe installation time and labor costs cut about 50% with Greenlee Pipe Pusher"

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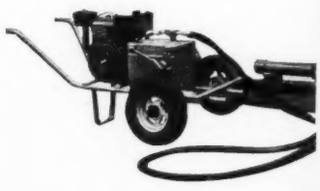

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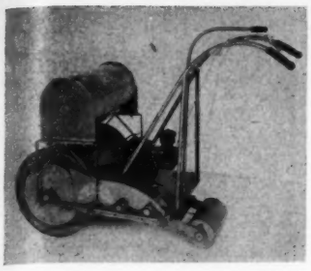

The Roll-Master utility roller offers up to 1,000 pounds of weight for small paving jobs.

Utility Power Roller Handles Small Paving Jobs

■ A new utility power roller has been announced by Hardsocg Pneumatic Tool Co., Ottumwa, Iowa. The small Roll-Master roller is recommended for use on driveways, walks, and curbings as well as in hot or cold-asphalt street repair.

The roller handles these jobs with a maximum weight of 1,000 pounds. A tank for hot asphalt provides extra weight.

For further information write to the company, or use the Request Card that is bound in at page 18. Circle No. 858.

Folder on Trailer Line

■ The Mastercraft line of trailers which includes a variety of units ranging from ¼ to 50 tons in capacity is shown in a folder available on request.

The literature lists specifications for two heavy-duty drop-deck semi-trailers with 25 and 20-ton capacities. It also shows single-axle dual-wheel trailers of the gooseneck and drawbar types. These are available in partial-tilt and level-deck models.

Several models of open and closed tool trailers are also shown in the folder.

To obtain this literature write to Mastercraft Trailers, Inc., 300 Middlefield St., Middletown, Conn., or use the Request Card at page 18. Circle No. 920.

Repair of Mortar Joints In Brick or Tile Floors

■ A new bulletin describes seven simple steps for repairing worn or corroded mortar points in brick or tile floors.

The procedure involves the use of non-shrink Embeco pre-mixed mortar for joints ¼-inch in width or wider. This product is marketed in ready-to-use form.

For joints less than ¼-inch wide, the literature recommends non-shrink Embeco No. 5, which must be combined with normal portland cement at the job site. According to the manufacturer, the procedure results in tight joints and lower maintenance.

To obtain Form E37 write to The Master Builders Co., 7016 Euclid Ave., Cleveland 3, Ohio, or use the Request Card at page 18. Circle No. 807.

INCLUDED in the equipment that Merritt - Chapman & Scott uses to construct the foundations for the Straits of Mackinac Bridge linking Michigan's upper and lower peninsulas are seven small Sea-Truck utility boats. The small diesel-powered craft, made of all-welded steel, were designed to serve as work boats, light tow boats, and crew boats. Forty feet long and having a 12-foot beam, the boats are light enough to be handled by a crane and transported on a trailer or truck. For further information write to Hans Hansen Welding Co., 318 Washington St., Toledo, Ohio, or use the Request Card at page 18. Circle No. 856.

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A row of drilled concrete piles exposed by the excavation is inspected by H. B. Mueller, executive engineer for the contractor. The 18-inch-diameter piles did double duty, preventing sloughing and providing lateral support for adjoining footings. *C&E Staff Photos*

Drilled concrete piles shore deep excavation

Forming system for concrete floors is suspended from building framework by thin steel straps

Carrying a basement excavation 28 feet below grade close to two large churches which had foundations at higher levels provided a challenging problem to the contractor constructing the new Central YMCA building in Milwaukee, Wis.

Sheet piling could have been driven, but the bracing system would have been in the way of the new construction, and the vibration from driving sheathing might have caused damage to the two churches. Instead, Gebhard-Berghammer, Inc., Milwaukee, Wis., the general contractor, took advantage of the heavy clay subsoil and devised an excavating method which proved to be not only satisfactory, but economical.

Just inside the property lines on the two sides adjacent to the churches, the contractor installed a double row of drilled piles. On one side of the excavation the piles and the concrete caps fell within the building lines and were incorporated into the structure.

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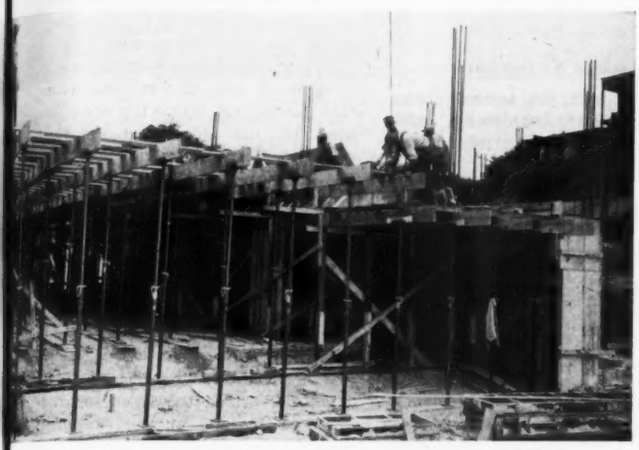
Contractors and Engineers

Magazine of Modern Construction

470 Fourth Ave., New York, N. Y.

To prevent the sloping clay sides of the excavation from sloughing during a rainy spell, they are protected with Sisalkraft paper and tarpaulins reaching back onto the berms. Framework is under way at the basement level.



Forms for the basement floor are supported by lines of Safway shores. The shores support the 2 × 10 joists, which in turn support 2 × 8 joist bearers placed flat-wise. Steel pans complete the forms.

On the other side, the piles were outside the building line, but they were left in place as the building was built. The piles acted as sheathing to prevent the banks from sloughing into the excavation and also provided firm lateral support at the property line to prevent any movements which might have weakened the support of the adjacent building footings.

This contractor again displayed ingenuity in the design of the formwork for the concrete floor system of the 18-story residential tower section of the building. Beam forms were suspended from the steel frame by Signode standard steel strapping of the type commonly used in packaging. Standard packaging tools were used to pull the straps tight and to crimp the fasteners. The beam forms supported Bethlehem steel joists on which the pan and joist floor forms were built. This combination eliminated the necessity for practically all

(Continued on next page)

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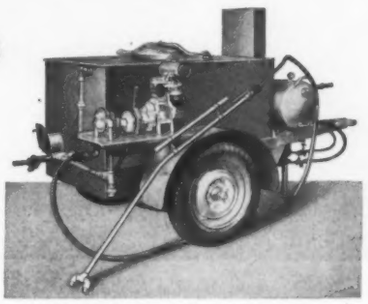

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Four blades for the truest, really level floor (a three-legged stool fits any floor, a four-legged stool NEEDS a *level* floor).

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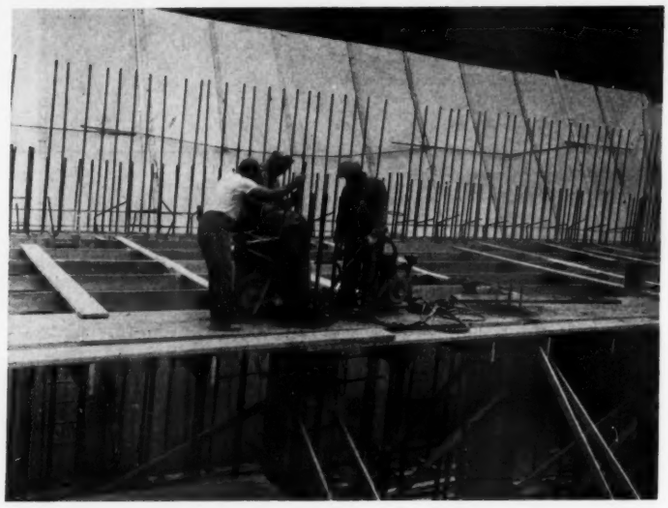

A beam bottom serves as a runway for workmen wheeling concrete to lower column forms. Forms are ⅝-inch plywood with 1 × 4 backers, held with Superior column clamps. A Maginniss Hi-lectric vibrator consolidates the mix.

C&E Staff Photos

(Continued from preceding page)

shoring in this part of the building.

This $6 million project, scheduled for completion early in 1956, includes a gymnasium, swimming pool, clubrooms, chapel, and theater, as well as many other social and recreational facilities. The portion adjacent to Wisconsin Avenue will be a residential tower 18 stories high. The site will have parking space for more than 50 automobiles.

Holes Drilled for Concrete Piles

Starting from the natural grade, the excavating subcontractor, Marchese Bros., Inc., Milwaukee, dug out the entire area to a depth of 14 feet. Two Lorain shovels, one a 1¼ and the other a 1½-cubic-yard unit, excavated the heavy clay soil and loaded it into a fleet of dump trucks. The 40,000 cubic yards of material was hauled about four miles to the Milwaukee County Stadium grounds for disposal. This excavation was carried right out to the side property lines. Where space permitted, slopes somewhat steeper than 1 to 1 were taken out of the adjacent property.

Two rows of drilled piles 18 inches in diameter and 22 feet deep were then placed just inside the property lines on the sides next to the churches. The rows were spaced 18 inches apart, and piles in each row were spaced 4 feet apart. Piles were staggered so that those of one row were between two piles of the other row. The 22-foot depth carried the bottoms of the piles about 5 feet lower than the adjacent column footings, providing ample resistance to lateral movement.

Stoll Earth Drilling Co., Blue Island, Ill., drilled the holes for the piles with an auger-type drill powered by a Buda diesel engine. The clay soil stood up very well without any kind of casing, but in a few cases where water was encountered, a sheet-metal sleeve was inserted in the hole. The holes were filled with concrete as soon as possible after they were drilled. Each pile was reinforced with six ¾-inch reinforcing bars which were placed as the concrete was poured.

When the piles had been poured, a continuous reinforced-concrete cap 2 feet deep and 4 feet wide was placed across the tops of the two rows of piles. The excavating contractor then continued the excavation to full depth in the central area of the basement, leaving a slope of about 1½ to 1 from the pile caps along the sides.

Footings for interior columns were then placed. A Gradall hydraulic shovel dug the footing holes below the normal subbasement level so accurately that, with a little hand trimming, they could be placed without forming. Wings or projections were cast onto some of the footings to serve as foot blocks for 16 × 16 timber braces or kickers, which were placed between the pile caps and these footings. These braces provided extra insurance against any possible lateral movement of the banks when the slope left by the grading contractor was removed and the excavation carried down to grade adjacent to the piles.

Underpin Church Foundations

Along part of the excavation on one side, the adjacent church projected practically to the property line. Since the foundation of this building was 12 or 13 feet above the YMCA foundations, it was necessary for the contractor to underpin the footings. Here again the stiff clay was an advantage.

A space 5 feet long under the old footing was excavated down to grade, and footing and wall were formed and placed in this space. Skipping a 10-foot space, the contractor repeated the process. This was continued across the entire side of the excavation. Then

Contract work on the Niagara River Remedial Project was directed by the district engineer of the Buffalo District, Corps of Engineers, U. S. Army.

Wire Rope at Work—Recently Norman H. McLain, Buffalo contractor, undertook the formidable task of diverting a portion of the swift Niagara River, just above the Falls. His was the job of exposing—temporarily—many acres of river bed so that thousands of cubic yards of rock could be removed. Purpose: to create a more uniform distribution of water over Horseshoe Falls and thereby check the severe erosion at the center of the crest.

In constructing his diversion dam, McLain first erected a shield that was held in place by Bethlehem wire ropes, anchored upstream. In addition, to prevent lateral drift, a separate cable was run from the shield to a nearby point of land. This device, secured by the strong steel ropes, made it possible to construct the temporary dam, section by section, and thus assure successful completion of the project.

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

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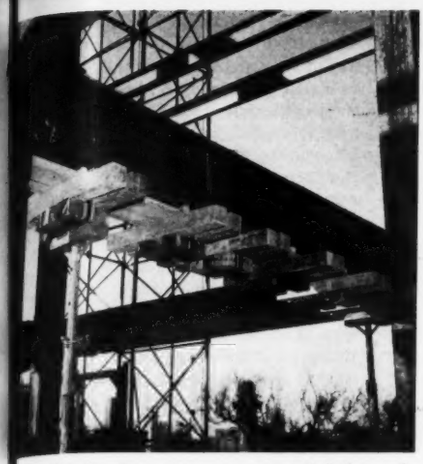

The forming system is suspended from the beams of the structural steel frame by Signode steel strapping.

Bethlehem lightweight steel form joists, supported on a ledger on the beam form, span more than 16 feet to support pan and joist forms for the floors.

Concrete blocks used for inside finishing are cut to exact size and shape by a Clipper masonry saw that is equipped with an exhaust fan.

the crews went back and took out a second 5-foot space and replaced it with concrete. After the third and final section had been underpinned in the same manner, the wall of the new building was poured adjacent to the underpinning.

While the clay banks stood up very well under normal conditions, they softened quickly when they became wet. During a particularly wet spell last summer, when it rained 32 days out of two months, the contractor protected the slopes with covers of Sisalkraft and tarpaulins. These, placed over all exposed banks, extended back onto the berms and provided complete shelter from rainfall. The covers were kept in place until the basement was completed and backfilled.

Concrete and Steel Frames

The residential tower section, which measures 40 × 162 feet, has a structural steel framework furnished and erected by Wisconsin Bridge & Iron

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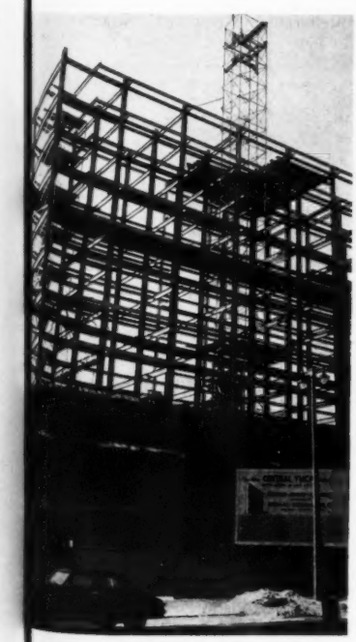

As steel reaches the 11th floor level for the 18-story residential tower building, concrete work is started on the lower floors enclosed with canvas tarpaulins. An Archer material tower delivers concrete and other materials to all floors.

How long to bridge this 62-foot span . . .

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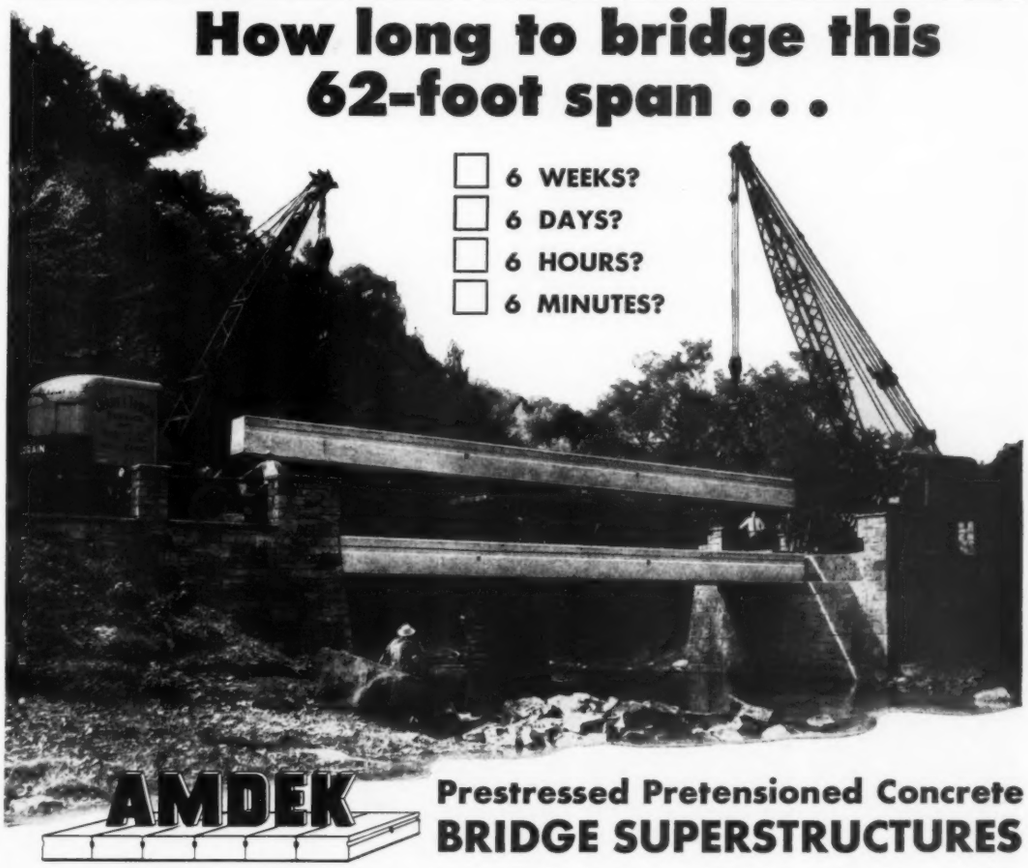

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Montreal, Canada

(*Continued from preceding page*)

Co., Milwaukee. A Northwest crane with 100-foot boom and 30-foot jib worked from the ground to set all the structural steel for the first 11 floors of the tower. When it was decided to increase the height of the building to 18 stories, a stiffleg derrick was mounted on the frame to complete steel erection. The third, sixth, and ninth floors were planked with 3-inch lumber to protect workmen below from falling objects.

One of the most unusual aspects of the job came when concrete was placed for encasing steel and floors of the tower section. The entire form system was suspended from the beams of the structural steel frame by Signode $1\frac{1}{4} \times 0.044$-inch steel strapping.

The 2-inch plank-beam bottoms of the forms rested on double 4×4 joists supported by short 3×4 hardwood blocks. The steel straps were passed around the hardwood blocks between the 4×4 joists and around the steel beam. Precast-concrete spacer blocks were placed between the form for the beam bottom and the lower flange of the steel beam to keep the form spaced the proper distance from the steel. The straps were then tightened with a Signode tightener and locked by crimping with a Signode seal.

Until the first two straps were cinched around the beam, the form was temporarily supported on two Safway steel shores. Once the straps were secure, the shores were removed and additional straps placed around the form at approximately 25-inch spaces, so that one strap was located at each joist of the floor system.

The double 4×4 joists under the beam bottoms also supported the beam sides and a 4×4 ledger which served as bearing for the floor forms. Bethlehem steel joists spanned more than 16 feet between beams to support the floor system. These joists were normally spaced at 25-inch centers to accommodate the 20-inch pans and 5-inch joists of the floor system. Each end of each steel joist was placed on the ledger where one of the straps was located. Each joist carried a 2×8 laid flatwise to support the pans and form the soffit for the concrete joists of the floor.

With this system, no shores were required to support the forms for a floor. This meant that the contractor could form and pour more than one floor at a time. He could even place concrete on higher floors first, if this proved to be of any advantage.

Everything but the steel bands was salvaged when the forms were stripped, permitting the entire system to be re-used many times. Even the hardwood blocks which took the load directly from the straps were re-used. These blocks were fitted with metal corners to keep the straps from cutting into the wood and becoming slack.

The tower section will be finished with aluminum and glass panels on two sides, and with brick on the remaining two sides. The aluminum wall panels will be fastened to the concrete floor and require no backing. Panels measuring 8.75×10 feet may be erected in one piece, making for a rapid closure of the building.

Forming Concrete Frame

The remainder of the building has a reinforced-concrete frame from the spread footings at the subbasement level up through the second floor. The third floor, framed with structural steel, has steel beams and trusses for the long spans over the gymnasium on that floor.

In this portion of the building, columns were formed with $\frac{5}{8}$-inch plywood backed by 1×4 lumber and tied with Superior column clamps. Forms for the floor system were supported on Safway steel shores which held 2×10 ledgers or form joists in their channelled tops. For the pan-type floors, 2×8 joist bearers were laid flatwise across the ledgers to form soffits for the concrete joists and to support the pans. Pans 20 inches wide and 12 inches high were nailed in place on the joist bearers to complete the form. The concrete joists were nominally 5 inches wide and the slab was $2\frac{1}{2}$ inches thick over the pans. At times, more than 1,000 Safway steel shores were in use on the job.

Forming the ceiling over the swimming pool was another tricky operation. The ceiling consists of seven reinforced-concrete girders 20 inches wide, 4 feet deep, and 40 feet long, with pan and joist construction between the girders. The distance from the bottom of the pool to the bottom of the girders is 35 feet. To support the heavy forms for the girders and floor, a line of Safway tubular scaffolding was set up under each girder. The Bethlehem form joists spanned between the scaffolding towers to support the floor system. Despite the difficulties of this part of the job, forming work on the ceiling was exceptionally fine.

Form panels for basement walls were made of plywood, backed by 2×4 studs. These panels were covered with Truscon form coating every two or three times they were used. This preserved the plywood so that the panels could be re-used 20 or more times. Superior snap ties and other Superior form hardware items were used to assemble the forms. The carpenter shop on the job where form panels were fabricated was equipped with a De Walt electric saw. Workmen also used Porter-Cable portable electric saws on the formwork throughout the building.

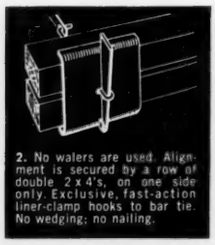
Placing Concrete

Several methods of concrete placing were used on the project. Concrete for drilled piles and spread footings was placed directly from ready-mix trucks. Walls below ground level were placed by a Lima Paymaster crane using a 1-yard concrete bucket. Concrete was placed in the lower columns and basement floor from wheelbar-

ATLAS COMPO FORMS

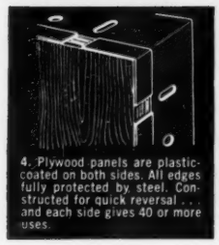
"Easiest and Surest Way to Save Money On Concrete Forming"

1. Atlas Compo Forms have the simplest tie system ever developed. Only 3 parts: tie, key and wedge.

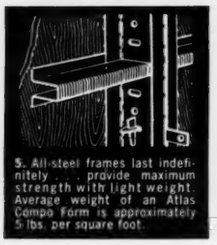


2. No walers are used. Alignment is secured by a row of double 2 x 4's, on one side only. Exclusive, fast-action liner-clamp hooks to bar tie. No wedging; no nailing.

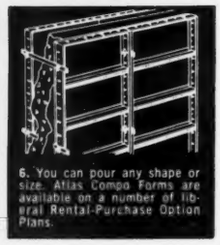
3. Newly-designed pilaster tie is adjustable for various size pilasters. Re-usable.



4. Plywood panels are plastic-coated on both sides. All edges fully protected by steel. Constructed for quick reversal . . . and each side gives 40 or more uses.

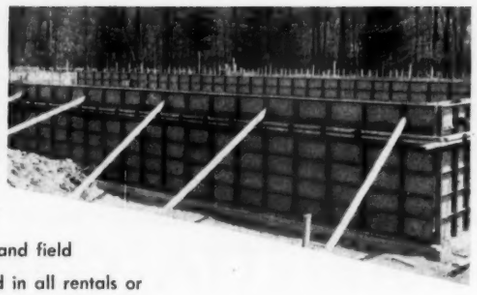


5. All-steel frames last indefinitely . . . provide maximum strength with light weight. Average weight of an Atlas Compo Form is approximately 5 lbs. per square foot.



6. You can pour any shape or size. Atlas Compo Forms are available on a number of liberal Rental-Purchase Option Plans.

Count on Atlas Compo Forms for faster erection, more accurate forming, speedier stripping and minimum finishing.



Complete layouts and field instruction included in all rentals or purchases. For help on any forming job, wire, phone or send plans for estimate. No obligation.

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Write for Illustrated Bulletin.

rows and buggies wheeled by hand from the truck-mixers.

Above the first floor, the concrete frame portion of the structure was constructed by a combination of methods. A crane and bucket hoisted concrete for the rear section of the building while an Archer material tower made the lifts on the street side. In both cases, workmen wheeled the concrete from hoppers to the forms in buggies. In the high section of the building, all concrete was hoisted in the bucket of the 130-foot steel tower. Pours of from 200 to 290 cubic yards were made in a day. Maginniss Hi-Lectric vibrators were used to consolidate the concrete on all pours. Manegold Stone Co., Inc., Milwaukee, supplied the ready-mixed concrete.

Concrete floors were troweled with a Whiteman finishing machine and cured with Sisalkraft paper. During cold weather the entire area in which concrete was being placed was enclosed with tarpaulins and heated during the pour and for at least three days afterward by Silent Glow oil-burning heaters.

Concrete blocks and other materials used for inside finishing were handled on pallets. A Yale hand-powered pallet truck with a capacity of 4,000 pounds moved the pallets around in the building. Concrete blocks and tile were sawed to exact sizes and shapes on a Clipper masonry saw equipped with a Clipper hood, exhaust fan, and duct. This removed dust so that sawing could be done inside the building without interfering with other work.

At ground level, the building measures 200 feet square. At the second floor level is a 75 × 150-foot projection over a portion of the parking area at the rear. This section is supported on exposed reinforced-concrete columns spaced at 39 × 34-foot centers. Concrete girders and beams span between the columns to support the floor. This section of the building is two stories high and its roof is designed as a sun deck. Roofs have precast-concrete decks with structural insulation and built-up roofing, and those designed as sun decks have brick surfaces.

Although the building will be heated from the central steam facilities of the Wisconsin Electric Power Co., Milwaukee, an auxiliary gas-fired boiler was installed in the basement. Provisions have also been made for the installation of air conditioning should this be desired later. The residential portion of the tower is served by two elevators.

General superintendent for Gebhard-Berghammer, Inc., is Gordon McCurdy. Executive engineer for the firm is H. B. Mueller. The method of using drilled piles for retaining the banks of the excavation, as well as the form suspension method, was developed by E. P. Berghammer, secretary-treasurer of the firm. The owner's representative on the job is G. R. Holmes, clerk of the works. THE END

M-C&S Elects McGough

Myles C. McGough has been elected a vice president of Merritt-Chapman & Scott Corp., in charge of the company's industrial and building construction department. He will serve under William Denny, executive vice president and general manager of the construction division.

write for further information
Swenson Spreader & Mfg. Co.
Lindenwood, Illinois

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Gives concrete better working qualities, and reduces tendency to segregate or bleed. Cuts costs, as it has greater air entraining potency than similar products. PERMITE N-TAIR is guaranteed not to segregate, settle out, become gummy or lose efficiency during storage. Available in 5-gal. pails; 30 and 53-gallon drums, either single or double strength.

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"INFERNO"® Pile Driver

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To avoid any doubt about the *safety* of steam hose for pile-driving, "Inferno" can now be easily identified by a black spiral stripe on the familiar red cover. There can be no mistaking an *unsafe* hose for the one with an unequalled reputation for strength, durability and safety in severest pile-driving service. Because it is built the Goodall way, you can rely on "Inferno" to stay on the job *longer*, without risk of bursting and consequent danger to men and damage to equipment.

"INFERNO" STEAM HOSE specifications include high-temperature tube; multiple-layer, braided steel wire carcass; red wear and weather-resistant synplastic cover. Sizes ½" to 3", inclusive, in maximum lengths of 50 feet.

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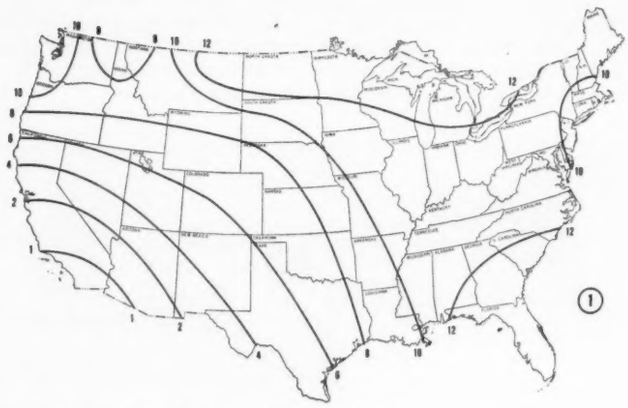

Chart 1. Days with .01 inch or more of precipitation.

Chart 2. Days with 1 inch or more of precipitation.

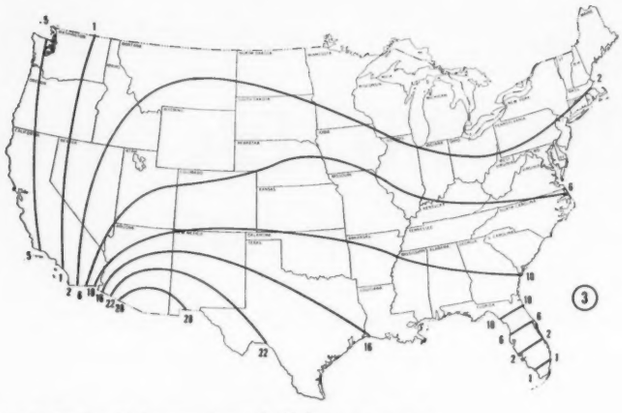

Chart 3. Days with temperatures of 90 degrees or more.

Chart 4. Days with thunderstorms.

The Weather Picture for June

The accompanying four maps chart average weather conditions for the month of June. Indicating the average number of days with precipitation, temperatures of 90 degrees or higher, and thunderstorms during the month, they represent an average of weather conditions during June over a period of more than 60 years, and are not to be considered specific forecasts. Weather Corporation of America has prepared the charts for CONTRACTORS AND ENGINEERS.

Black lines on the maps indicate the average number of days when these separate conditions occur. Where the number of days is represented by a decimal value, such as .5, .25, and .1, the condition occurs on the average of once every 2, 4, and 10 years, respectively.

If a contractor is bidding on a job at Omaha, Nebr., and needs at least 15 full working days next month, he may determine his chances of completing the job thus: Referring to Chart 1, he finds that of the 30 days in the month, an average of 10 have rainfall in the Omaha area. That leaves him with an average of 20 working days, and favors his chance of completing the job during the month.

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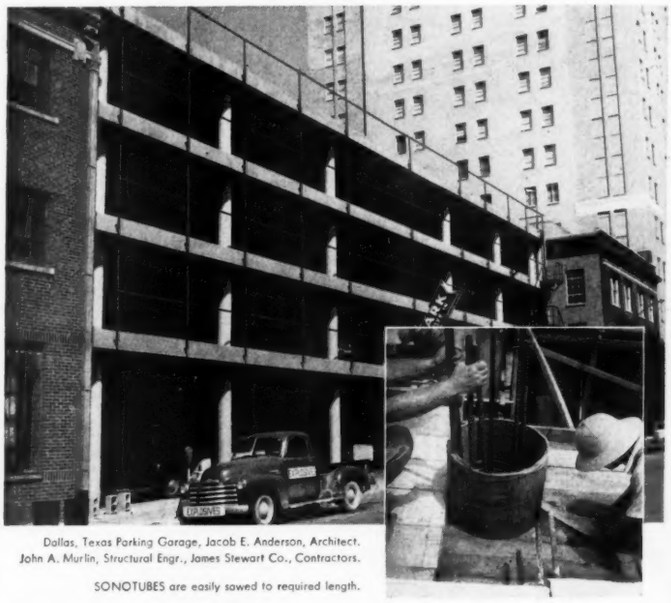
FIBRE FORMS

for round columns of concrete



Dallas, Texas Parking Garage, Jacob E. Anderson, Architect. John A. Murlin, Structural Engr., James Stewart Co., Contractors.

SONOTUBES are easily sawed to required length.

Save time on formwork!

. . . low cost SONOTUBES make it possible

Construction time for this Dallas Parking Garage required only 27 days. And one of the major factors contributing to the savings in time and money was the use of low cost SONOTUBE Fibre Forms.

SONOTUBES were dropped over vertical and spiraled reinforcing rods to provide the formwork for the round concrete columns. Holes to receive the fibre forms were precut in the beam formwork.

SONOTUBE Fibre Forms handle easily because they are lightweight . . . take less time to erect because they require minimum bracing. Approved by architects and engineers everywhere, widely used by contractors.

SONOTUBES are available in 31 sizes from 1″ to 36″ I.D. up to 50′ long. Can be supplied in specified lengths or sawed to your requirements on the job.

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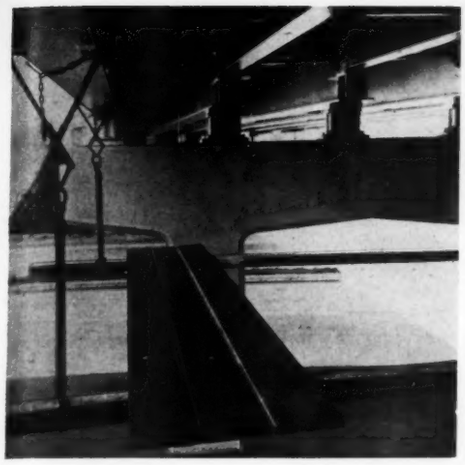
Apparently gum-chewing is not a recent phenomenon. Prehistoric mastodon molars unearthed today often have spruce gum still in the crevices of the 7-inch-wide teeth that chewed the gum from forest trees before the ice age.



The Swing-Lo scissors beam scaffold makes an easily assembled suspended scaffolding.

Scissors Device Makes Suspended Scaffolding

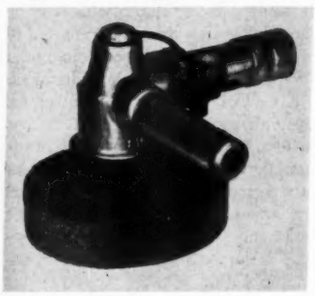
■ A new device for suspending scaffolding from rolled beams on structures such as bridges has been marketed by Swing-Lo Suspended Scaffold Co., Covert, Mich. The Swing-Lo scissors beam scaffold is adjustable for I-beam width and height, and is readily moved along the beams.

Used in sets of four or more, the brackets support 4×4-inch wood beams upon which plank platforms are set. The resulting scaffold gives easy access between the beams and girders of the structure.

As a safety measure, a chain holds the "scissors" in place on the beams. A steel pin locks through the adjustable rods and cannot slip out. The manufacturer reports that a distributed weight up to 2,000 pounds can safely be carried on the suspended scaffold.

For further information write to the company, or use the Request Card at page 18. Circle No. 845.

Improved Angle Head for Flexible-Shaft Grinders



The new Quick-Change angle head for Wyco flexible-shaft grinders.

■ A new angle head for Wyco flexible-shaft grinders has been announced by Wyzenbeek & Staff, Inc., 223 N. California, Chicago, Ill.

The Quick-Change angle head features thumb-controlled water feed, fully-protected copper feed line, adjustable wheel guard, and precision ball bearings. The new angle head permits changing from coarse to fine grinding wheels, or to a straight handpiece as required.

For further information write to the company, or use the Request Card at page 18. Circle No. 849.

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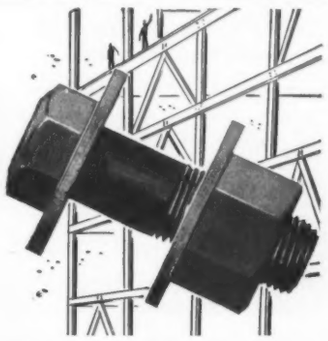

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CARBURIZED **WASHERS**

for STRUCTURAL STEEL FRAMING

Today the swing in field assembly of structural steel joints is definitely toward *High Strength Bolting*. According to competent authorities who have had practical experience with this form of construction and evaluated its benefits, it is possible to *build better* and *build faster* by employing this method of joining steel members.

A primary essential, of course, is to use heat-treated, quenched and tempered bolts to produce a minimum ultimate strength of 120,000 psi for the usual size of bolt. At the same time, nuts must meet a proof load equivalent to the ultimate load of the bolts . . . *and the washers must be hardened, special quality steel.*

And because no bolt assembly is any better than its washers, consistent high-strength bolting should include the use of MIL-CARB Carburized Washers.

MIL-CARB Carburized Washers are fabricated from Prime Carburizing Quality Special Soundness Steel, which insures uniform quality control, always equal to the rigid specifications for this form of steel assembly (ASTM Designation A325, applying to bolts, nuts and washers).

Additionally, MIL-CARB Washers overcome inherent weaknesses often present in heat-treated washers fabricated from steel of questionable quality.

For uniformly sound construction specify MIL-CARB Carburized Washers

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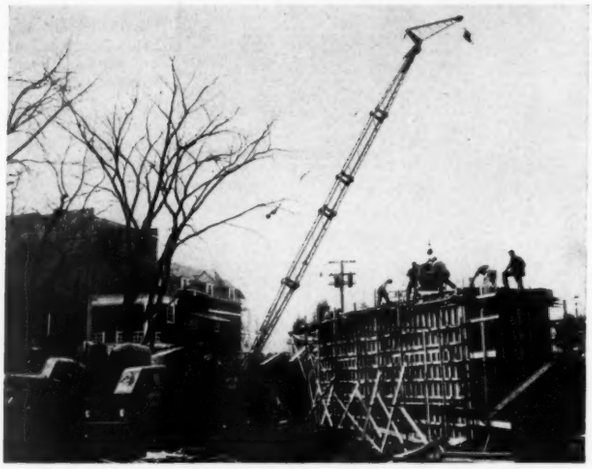
Improvements in Excavator-Cranes Include Bigger Power Plant and New Clutch Design



The new, more powerful Schield Bantam T-35A crane is shown with 50 feet of crane boom and an 8-foot jib handling concrete pouring on new construction.

■ Fifteen major improvements have been made in the Schield Bantam line of ⅜-cubic-yard 5 and 6-ton truck and crawler - mounted excavator cranes, according to an announcement from the manufacturer. The new carrier-mounted model will be called the T-35A and the crawler-mounted unit is designated the C-35A.

A six-cylinder Continental F-186 gasoline engine is now standard equipment on all Bantam units. The new engine, which replaces the four-cylinder power unit used previously, develops 41.5 hp at 1505 rpm, and gives smoother operation, more torque, and less vibration.

A second important improvement consists of a rigid two-shoe internal-expanding swing clutch with floating shoes. This new design is reported to result in smooth operation, long lining and drum life, and simple adjustment.

A new cast-steel drive tumbler for the crawlers has hardened rollers that turn on hardened pins mounted in the tumbler itself to provide a rolling contact between the driving tumbler and the shoes. The driving lugs of the track shoes have been given an involute or curved surface for correct engaging action between the shoe lug and tumbler roller.

By using steel with higher carbon and alloy content and a special flame hardening process, Schield Bantam has provided many essential parts of the excavators with a longer expected-service life. In the vertical swing shaft and the directional clutch shaft, the steel alloy content has been increased for greater strength. The teeth of the bevel gear on the vertical track drive and the ring bull gear are now flame-hardened for longer life. The trunnion base roller path is similarly treated to keep maintenance needs low.

Other improvements include new roller brackets that provide for four rear hook rollers, spreading the supporting surface and relieving load stress on any single portion of the roller path. A new plate lock has been added so that each lock dog lever can be operated and locked independently.

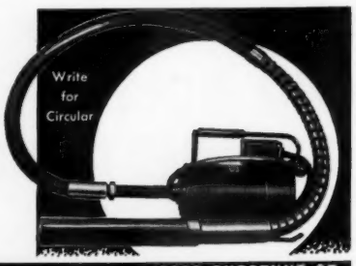
The side frames of the crawler are now of the bolt-on type. This allows quick changeover to the wide-base model of the C-35 crawler.

H & L No. 24 replaceable tooth points are now being used on all Schield Bantam digging buckets including dragline, shovel, moles paw, and backhoe.

For further information write to Schield Bantam Co., Waverly, Iowa, or use the Request Card that is bound in at page 18 of this issue. Circle No. 934.

ELECTRICALLY POWERED ROETH VIBRATOR

A light-weight Vibrator, delivering as much as 8,000 vibration frequencies per minute. It is easy to handle and rates high with users who have electric power available. Motor weighs 32 lbs. and develops two hp. under full load.



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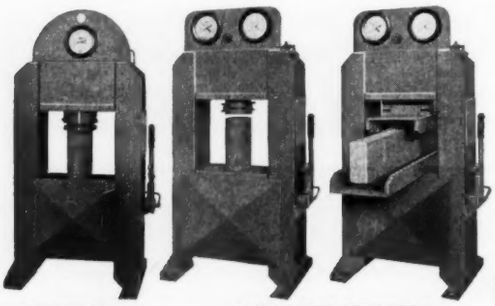

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The rugged "box type" construction of the "Junior" gives you unusual strength and rigidity for such low prices. The sides are of fabricated 3/16" steel plate formed into a channel 16" deep with 2" legs. A steel belt cover completely covers the top, giving additional rigidity and completely encasing the return belt so as to prevent material from working in to cause belt damage.

The under-slung power unit provides easy access for operation and servicing. Self-cleaning tail pulley, bar type head pulley, ball bearings throughout and heavy duty truck axles and tires are included to give it the biggest combination of fine features to be found anywhere in the low price field.

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Ripper for Motor Graders Speeds Shoulder Work

■ A special ripping attachment for motor grader moldboards makes it possible to rip road shoulders with all six grader wheels on the ground, thus utilizing the grader's full motor power.

The ripper is especially useful for backsloping and ditching, for working on shoulders and banks, and for work in other areas not easily accessible to the standard scarifier block.

The new Hensley ripper fits all motor graders and most small dozers with moldboards 18 to 24 inches in height. Ripping depths are 7, 13, and 17 inches.

For further information write to Hensley Equipment Co., Inc., 800 Peralta Ave., San Leandro, Calif., or use the Request Card that is bound in at page 18 of this issue. Circle No. 909.

Rotary Concrete Finisher Has Retractable Wheels

■ The latest Champion rotary concrete finisher has balanced retractable wheels for easy portability on the job. In addition, a positive-action clutch which engages power smoothly without bucking or grabbing has been added to the machine.

The finisher is available in a choice of ring sizes 29, 36, and 48 inches in diameter. A free-floating-drive base has been designed to give more accurate pitch adjustments for both floating and flinshing trowels.

The finisher comes equipped with one set of Champion Gold-Seal finishing trowels as standard equipment.

For further information write to Champion Mfg. Co., 2028 Washington Ave., St. Louis 3, Mo., or use the Request Card that is bound in at page 18. Circle No. 877.

One man can move this new Champion rotary finisher around the job on retractable wheels.

Two-Way Radio Designed For Heavy Industrial Use

■ A folder on mobile radio equipment describes the Bendix Command-Air series. Designed for industrial use, these radio systems are available for installations requiring a single or several base stations and one to hundreds of mobile units.

Complete systems are available for operations on the 25-50 or 152-174-mc band. A wide selection of models offers transmitter RF outputs ranging from 2½ to 60 watts.

The folder also describes equipment with heavy-duty shockmounts, weatherproof housing and loudspeakers, and specially constructed control units. This equipment has been designed to withstand use under conditions of extreme shock, and where inclement weather and excessive dust ordinarily cause early failure in conventional communications equipment.

To obtain this literature write to Bendix Radio, Division of Bendix Aviation Corp., Baltimore 4, Md., or use the Request Card at page 18. Circle No. 802.

Weekend crashes accounted for 13,980 killed, 678,000 hurt during 1954.

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Swing-Lo Suspended Scaffold Co., Covert, Michigan.

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POWER AUTHORITY OF THE STATE OF NEW YORK
ADVERTISEMENT FOR PROPOSALS
FOR CONSTRUCTION OF IROQUOIS DAM
NEAR POINT ROCKWAY, ST. LAWRENCE COUNTY, NEW YORK
SPECIFICATION NO. PA-5-11011
ST. LAWRENCE CONTRACT NO. 11

NOTICE TO CONTRACTORS: The POWER AUTHORITY OF THE STATE OF NEW YORK will receive sealed proposals for the construction of Iroquois Dam and appurtenant works near Point Rockway, St. Lawrence County, New York in the following ways:

(1) If brought in person on the day of receiving bids until 11:00 A.M. Eastern Daylight Saving Time on the 26th day of May, 1955, in the Chamber of Commerce Building of the State of New York, 65 Liberty Street, in the "Great Hall" located on the 2nd floor, New York, New York.

(2) If mailed in until 10:30 A.M. Eastern Daylight Saving Time on the 26th day of May, 1955, at the Authority's office, 270 Broadway, Room 1300, New York 7, New York.

The proposals will be publicly opened and read aloud at the time and at the address given in (1) above.

The principal items of work are:

Estimated:	214,000 cu. yds.	Excavation for Cofferdams
	14,300 MFBM	Timber Cribs for Cofferdams
	279,000 cu. yds.	Crib Fill for Cofferdams
	2,900 tons	Steel Sheet Piling for Cofferdams
	2,726,000 cu. yds.	Excavation, Common, Dry
	39,000 cu. yds.	Excavation, Rock, Dry
	1,240,000 cu. yds.	Excavation, Common, Wet
	18,500 lin. ft.	Drill Holes for Exploration and Grouting
	91,300 cu. yds.	Embankments and Protection Stone
	161,620 cu. yds.	Concrete
	8,526,000 lbs.	Structural Steel and Miscellaneous Metalwork
	13,260,000 lbs.	Erection of Gates and Guides
	1,300,000 lbs.	Erection of Gantry Cranes

The work shall be completed on or before February 28, 1958.

Plans, specifications and Proposal Forms for the work will be on file in the Authority's office and in the offices of the Engineer, Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts, and the Hydro-Electric Power Commission of Ontario, 620 University Avenue, Toronto 2, Ontario, and may be inspected by prospective bidders during office hours.

Plans, specifications and Proposal Forms may be obtained from the Power Authority of the State of New York, 270 Broadway, Room 1300, New York 7, New York, upon application and prepayment of a fee of Fifty ($50.00) dollars per initial set and Twenty-five ($25.00) dollars per set for additional sets, no part of which will be refunded.

Bids must be made in duplicate in accordance with instructions contained in the Information for Bidders. Guarantee will be required with each bid in an amount not less than 10 percent of the gross sum bid except that guarantee in excess of $2,000,000 will not be required.

The right is reserved to reject any or all bids.

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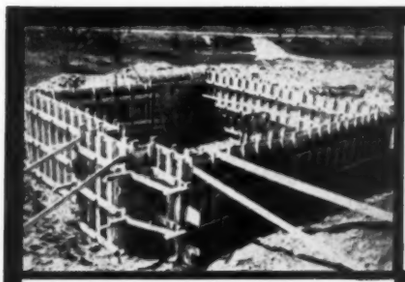

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MANUFACTURER MEMOS

C. I. T. Corp. News

A new division of C. I. T. Corp., industrial financing firm of New York, N. Y., has been set up to handle the financing of construction machinery in Michigan. Located at 1625 Cadillac Tower, 65 Cadillac Square, Detroit, the division will be headed by Wallace B. MacGregor.

The Detroit division, the twelfth such office set up by the firm, will operate in all of Michigan except the upper peninsula. The area previously was under the jurisdiction of the Chicago division.

The Colorado, Wyoming, and North and South Dakota representative for C. I. T. Corp., is William R. Lappin. Mr. Lappin, who will make his headquarters in Denver, Colo., succeeds vice president Paul F. Franklin, division head, as representative for the area.

Morgan R. Butler, president of the Butler Bin Co., Waukesha, Wis.

Morgan R. Butler Honored By New York University

A certificate of distinction for "professional achievements and services to the common good" has been awarded by New York University, New York, N. Y. to Morgan R. Butler, Sr., president of the Butler Bin Co., Waukesha, Wis. Since the founding of its College of Engineering in 1855, New York University has conferred only 100 similar honors.

Mr. Butler, a 1908 civil engineering graduate of the university, is widely known for his engineering achievements in precision equipment for material handling, particularly equipment for all types of concrete construction.

Under his direction, the Butler Bin Co., developed the first completely electronic batcher which substitutes electronic for human control in concrete mixing through the use of card-controlled selection, proportioning, filling, weighing, and discharge of aggregates and cement mixes.

Executive Vice President For Wisconsin Motor Corp.

Phil Norton, former vice president in charge of sales for Wisconsin Motor Corp., Milwaukee, Wis., has been made executive vice president of the company. With the manufacturer of heavy-duty air-cooled engines since 1924, Mr. Norton has been with the sales division for 25 years.

The newly appointed executive vice president of Wisconsin Motor Corp., Phil Norton.

In other appointments made by the company, F. B. Esty was advanced to the post of chief engineer. He has served as assistant chief engineer since joining the firm in 1948.

Ralph Switzer has been promoted to the position of director of research and development engineering. He has been with Wisconsin Motor Corp. since 1928.

Assistant Vice President Appointed by Gar Wood

William L. Davies has been made assistant to Walter C. Robertson, vice president of Gar Wood Industries, Inc., New York, N. Y., manufacturer of truck bodies, hoists, cranes, and other earthmoving equipment.

Mr. Davies, who will make his headquarters in Washington, D. C. formerly was district representative for Athey Products Corp. During the Korean emergency, he was assistant director of the Construction Machinery Division, NPA.

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Higbee Heads Organization On Surveying and Mapping

The American Congress on Surveying and Mapping elected Lester C. Higbee president at its 15th annual meeting in Washington, D. C. Mr. Higbee is president of W. & L. E. Gurley, Troy, N. Y., manufacturer of engineering and scientific equipment.

Lester C. Higbee, president of the American Congress on Surveying and Mapping.

A civil engineering graduate of Rensselaer Polytechnic Institute, Mr. Higbee served in both World Wars, during the last as a brigadier general. He became president of the Gurley firm in 1952, after serving the company as director of engineering, general sales manager, and secretary. He is a member of the American Society of Mechanical Engineers, the New York State Society of Professional Engineers, American Society of Photogrammetry, and the Engineers Club of New York.

Van Zee Heads Officers Of Engine Institute

Elected president of the International Combustion Engine Institute is B. G. Van Zee, chief engineer of the automotive engineering division of Minneapolis-Moline Co., Minneapolis, Minn. The institute represents manufacturers in the high-speed gasoline and diesel-engine fields.

The vice president of the institute is E. Don Tull, vice president and general manager of Cummins Engine Co., Inc., Columbus, Ind. H. W. Smith, consulting engineer for the engine division of Caterpillar Tractor Co., Peoria, Ill., is secretary, and Phil Norton, vice president in charge of sales for the Wisconsin Motor Corp., Milwaukee, Wis., is treasurer. J. E. Heuser, general sales manager of the Le Roi Division of Westinghouse Air Brake Co., Milwaukee, Wis., is now serving as a member of the institute's board of directors.

Bucyrus-Erie Co. Adds To Sales Organization

Two appointments have been made in the sales staff of Bucyrus-Erie Co., South Milwaukee, Wis., maker of heavy construction machinery. The former Mexican field representative, Edwin T. Goree, has been made assistant sales manager for the company's excavator distributors. John H. Plehn has been appointed a sales representative for the company's line of general purpose excavators and drills. He will work from the Seattle, Wash., office.

A list of coming conventions appears on page 19 of this issue.

The president of Griffin Wellpoint Corp., New York, N. Y., H. J. Hush.

Griffin Wellpoint Elects Hush as President

H. J. Hush has been elected president of Griffin Wellpoint Corp., New York, N. Y., manufacturer of diesel engines, generator sets, wellpoint systems, and jetting and self-priming pumps.

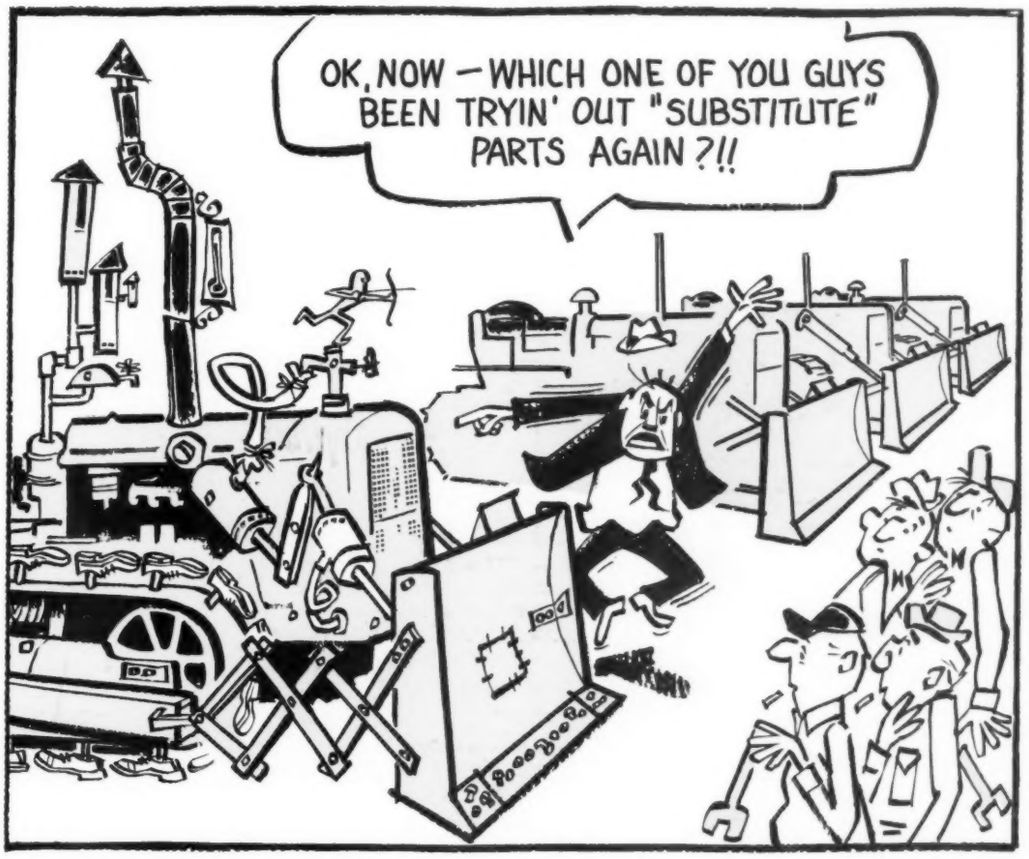
In the election of company officers, Francis D. Griffin was named chairman, and Walter W. Brennan, vice president. Elected vice president and treasurer was David H. Griffin. Vice president and secretary is David A. Werblin.

H. J. Hush succeeds the late Timothy G. Griffin who founded the firm. Besides the main office in New York City, Griffin enterprises have branches in Hammond, Ind., Jacksonville, Fla., and Houston, Texas.

Changes Made by Syntron

A number of promotions have been made in various offices of the Syntron Co., Homer City, Pa. Thomas Herald is now vice president of the Syntron Buffalo Sales Co., succeeding Charles Topping. In the Syntron Cincinnati Sales Co., Nashville, Tenn., Flavel Nelms is serving as district manager for all of Tennessee. This office, like the Buffalo Company, handles sales of Syntron vibratory equipment, power tools, feeders, conveyors, and related equipment.

Frank Day has been added to Syntron Los Angeles Sales Co., Los Angeles, Calif., Thomas Lewis Hainline has been appointed tool salesman for Syntron Kansas City Sales Co., Kansas City, Mo. John Sirles has been transferred to Syntron Newark Sales Co., Newark, N. J.



Down time is no joke. Best way to avoid it is to insist on genuine CAT* parts every time. Then you're sure of getting parts that are made to the latest design, precisely manufactured of the right materials, rigidly inspected and tested.

Take filters, for example

Non-genuine Caterpillar filter elements look like the real thing. They'll fit, too. They may even have plastic-impregnated elements — but how much surface area do they have? Look at the picture below. It shows what a genuine Cat surface-type filter is like *inside:* a plastic-impregnated paper element that does not absorb water, accordion pleated, for maximum surface area, around a perforated metal tube, enclosed in a perforated paper cover. This filter will *not* remove oil additives. It *will* remove abrasive particles as tiny as 39-millionths of an inch. A substitute filter — well, who can be sure?

The difference on the job: working in heavy dust, even in mud and water, genuine Cat filters — matched to the requirements of Caterpillar Diesel Engines — will keep these engines running longer, will keep maintenance costs low.

With substitute parts: who can be sure?

Better get genuine Caterpillar parts every time.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

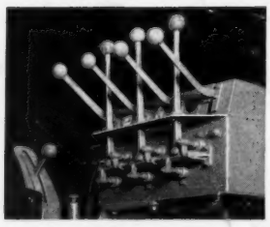
*Both Cat and Caterpillar are registered trademarks — ®

More "Big Machine" Features on the MICHIGAN C-16 than on any other ½-yard crawler!

This is a fact: more "big machine" features are *standard equipment* on the MICHIGAN C-16 than on any other ½-yard crawler. It will pay you to look underneath — look inside to see how much more you get for your money.

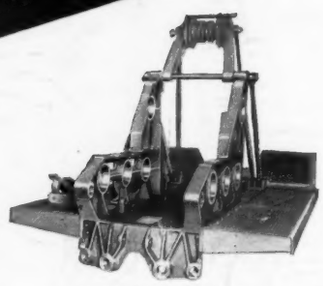
This machine is built for quality-conscious users—for bigger yardage, bigger tonnage, and substantially lower maintenance. The C-16 invites a feature-by-feature comparison with other same-capacity machines.

Write for detailed literature on this ½-yard crawler with big machine features and durability. Or contact your local MICHIGAN distributor. Like all MICHIGAN machines, the C-16 is available on a low-cost Lease Plan—details available.



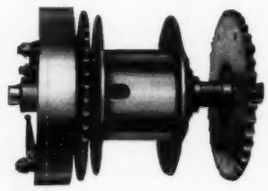
Power Control Independent Travel

Air Controls are standard on all MICHIGANs . . . fast, smooth, precise, with low operator fatigue. Independent Travel is also standard . . . move up while hoisting, swinging, or dumping.



Cast Steel Deck

This feature is usually found only on 1-yd or larger machines. C-16 deck is one-piece, alloy steel casting . . . side frames, boom foot lugs and roller brackets are cast integral. No misalignment!



Power Load-Lowering

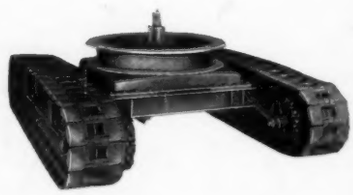
Four shafts on the C-16: Swing, Hoist, Travel and Crowd . . . each with its independent clutches. For precision crane work, the hoist line can be reeved on the front drum to provide Power-Up and Power-Down.

Six Hook Rollers

You can swing the boom just by leaning against it. There are 6 ball bearing-mounted adjustable hook rollers on the C-16 . . . grease twice a year. Most other ½-yd machines have only 3 or 4 rollers, bushing-mounted.

Smooth Clutches

There's nothing smoother than MICHIGAN air-operated segmented disc clutches . . . and they are self-compensating for heat, self-ventilating and self-cleaning. All segments are interchangeable.



Cast Steel Car-Body

Circle gear, with hook roller paths, internal gear teeth, center post, and crawler drive gear case is cast integral. Standard alloy steel tracks are 20″ wide, 9′10″ long. Swamp pads are optional: 30″ wide, 11′10″ long.

CLARK EQUIPMENT

CLARK EQUIPMENT COMPANY, 384 Second Street, Benton Harbor, Michigan. (29A)

Construction Machinery Division
Phone: WA 6-6184

Please send literature:

☐ C-16 Detailed Bulletin

☐ MICHIGAN Lease Plan Bulletin

Name_____

Firm_____

Address_____

City_____ Zone_____ State_____